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Paul S. Oberman

Academic Help-Seeking in the High School Computer Science Classroom:
Relationship to Motivation, Achievement, Gender, and Ethnicity
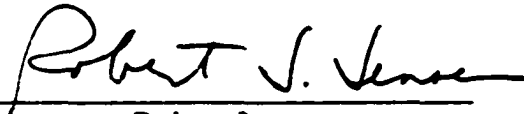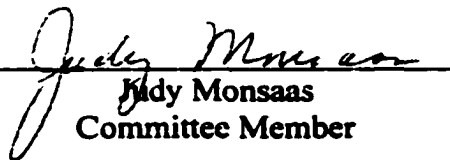
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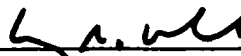
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An Abstract of
A dissertation submitted to the Faculty of the Graduate
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Abstract

The primary objective of this study was to determine the degree to which constructs prominent in the area of academic motivation predict the executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking of high school students enrolled in computer science (N = 314). Separate analyses were conducted for boys and for girls, as well as for African American, Asian American, and White students. Because instruments with sound empirical properties were not available, scales were first created or adapted for each help-seeking construct. Results from exploratory factor analyses, reliability estimates, intercorrelations, and correlations with motivation variables showed that the new scales had stronger psychometric properties than did those previously in use. Task goals and performance-avoid goals were more consistent predictors of academic help-seeking than were self-efficacy, self-concept, self-efficacy for self-regulation, anxiety, or computer science capability. Task goals were positively associated with adaptive help-seeking variables such as seeking instrumental help and perceiving the benefits of help-seeking and negatively associated with maladaptive variables such as seeking executive help or avoiding help-seeking; performance-avoid goals were negatively associated with adaptive help-seeking and positively associated with maladaptive help-seeking. There were no differences in help-seeking by gender or by ethnicity. However, despite possessing equal computer science skills, girls reported lower self-efficacy, self-concept, self-efficacy for self-regulation, and value, as well as higher anxiety, than did boys. These findings are consistent with those of researchers who report differences favoring boys in areas such as mathematics, science, and technology. Implications and recommendations are included.

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CHAPTER I
INTRODUCTION

Until 1981, academic help-seeking was viewed as a dependent behavior. Because the Western view of rugged independence was judged to be a critical aspect of problem-solving, individual perseverance was praised, and asking for help was considered a sign of weakness. Researchers have argued that persevering alone without success should be considered dysfunctional, whereas appealing for help, particularly of the type that would also be of service when an individual is faced with similar problems in the future, is actually an adaptive response to being blocked on a problem (Nelson-Le Gall, 1981, 1987; Newman, 1990; Puustinen, 1998). An important contribution to this line of research has been the distinction between executive help-seeking and instrumental help-seeking (Nelson-Le Gall, 1981). Executive help-seeking represents a request for someone else to complete a task, whereas instrumental help-seeking entails a desire to seek only as much assistance as necessary to complete the task. According to this distinction, instrumental help-seeking is viewed as an adaptive behavior whereas executive help-seeking is viewed as a maladaptive, dependent behavior. Because help-seeking is such a prominent part of a student's academic experience, research in this area has increased steadily. Researchers have investigated the help-seeker, the help-provider, avoidance of help-seeking, the perceived benefits of help-seeking, and the

environment in which help takes place. Researchers have also provided teachers with methods to increase the adaptive help-seeking of their students.

Statement of the Problem

Although there has been a significant amount of quantitative research investigating academic help-seeking, researchers have yet to study help-seeking in the computer science classroom, an environment in which extensive interaction takes place between student and teacher and among students (Schofield, 1995). Because of the significant number of help-seeking opportunities that arise in a computer laboratory, and because the classroom of the future in almost all academic areas is likely to include computers in a laboratory-like setting, this is an important setting in which to understand help-seeking and help-seekers.

It has also been difficult to compare academic help-seeking findings because the motivational variables used in these studies have not been operationalized in a manner consistent with the construct's theoretical home. Self-beliefs have been operationalized and utilized in studies in different ways as a result of varying conceptualizations by different theoretical camps (Bong, 1996; Pajares, Miller, & Johnson, 1999). This has led to inconsistent findings concerning the relationship between help-seeking and variables considered critical to academic help-seeking, including self-efficacy and self-concept.

Researchers have investigated whether girls or boys are more likely to seek help and particularly whether girls or boys are more likely to seek instrumental help. If, for example, it can be determined that boys seek less instrumental help in the computer science classroom, then interventions can be created that address the reluctance of boys in particular to seek adaptive help. However, findings related to differences in help-seeking

by gender have been inconsistent. If findings from such areas as mathematics classrooms can be expected to predict similar results in the computer science classroom, then some researchers would argue that boys will likely seek more help in the computer science classroom because it is a domain in which they feel comfortable (Kennedy, 1997; Newman & Goldin, 1990; Newman & Schwager, 1993). Other researchers would argue that boys will feel threatened by needing help in computer science, an area over which they would be expected to have mastery (Nadler & Fisher, 1986; Ryan, Gheen, & Midgley, 1998; Ryan, Hicks, & Midgley, 1997). Nadler (1997) and others have also argued that help-seeking may be more consistent with the dependent female sex role, leading female students to seek more help than do male students (Nelson-Le Gall, 1981, 1985). Because no clear answers have emerged, interventions have not been able to target a specific gender for improvement in academic help-seeking.

Researchers investigating academic help-seeking as a function of ethnicity have either conducted homogeneous studies of African American students (Nelson-Le Gall & Jones, 1990) or heterogeneous studies in which no differences by ethnicity are found (Ryan et al., 1997). If there are indeed differences by ethnicity, it is important for educators to be aware of these distinctions.

Finally, numerous researchers have contended that some gender differences in social, personality, and academic variables may be a function of gender orientation—students' stereotypic beliefs about gender—rather than of gender *per se* (Harter, Waters, & Whitesell, 1997; Harter, Whitesell, & Kastelic, 1998; Pajares & Valiante, 2001). Gender orientation beliefs are organized knowledge structures that include the gender-related attributes that are the defining behaviors associated with membership in a

certain gender (Burke, 1996; Bussey & Bandura, 1999). Over the course of time most children come to believe that boys are adventurous, competitive, and interested in mathematics and technology related activities, whereas girls are viewed as caring, relational, and interested in reading and writing related activities. Gender differences in variables such as moral voice tend to disappear when gender stereotypical beliefs are accounted for. Girls who report a strong masculine orientation do not differ in their expression of their moral voice from boys with a similar orientation (Harter et al., 1997). Similarly, although gender differences in motivational beliefs concerning writing favor girls, these differences are rendered nonsignificant when feminine gender orientation beliefs are controlled (Pajares & Valiante, 2001). Just as gender differences in some motivational variables have been demonstrated to be a function of gender orientation, gender differences in academic help-seeking are also likely a function of gender-stereotypic beliefs rather than gender. Should this prove to be the case, help-seeking interventions would be more appropriately directed toward individuals with certain gender orientation beliefs.

<div align="center">Purpose of the Study</div>

Since 1981, researchers have attempted to discover the type of person most likely to seek instrumental help, to seek executive help, or to avoid help. Attention has also been paid to issues such as whether students prefer help from peers or from adults, whether help-seeking is a developmental skill, and what students perceive to be the benefits of seeking help. Researchers have investigated the relationship between help-seeking and motivational factors such as achievement goals, perceived academic competence, and self-concept . In addition, they have investigated the degree to which

help-seeking is a function of gender and developmental level (Ames, 1983; Karabenick & Knapp, 1991; Magnusson & Perry, 1992; Nelson-Le Gall, 1987; Nelson-Le Gall & Jones, 1990; Newman, 1990, 1991; Ryan & Pintrich, 1997). The connection between academic help-seeking and these constructs has received attention because of the importance of students seeking help when needed to facilitate learning, rather than sitting passively or persevering without success.

In a parallel development, some qualitative researchers investigating the computer science classroom have noted the high number of help-seeking opportunities available to students (Oberman, 2000; Schofield, 1995). In this dissertation, I use quantitative methodology to investigate academic help-seeking in the high school computer science classroom, an environment dominated by students seeking help from both the teacher and their peers that has not received attention from quantitative researchers interested in academic help-seeking.

The primary objective of this study was to determine the degree to which constructs prominent in the area of academic motivation predict the executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking of high school students enrolled in computer science. Separate analyses were conducted for boys and for girls, as well as for African American, Asian American, and White students. Because instruments with sound empirical properties were not available, scales were first created or adapted for each help-seeking construct. In addition, I sought to discover whether mean scores in the help-seeking variables would differ by gender and/or by ethnicity. Finally, if gender differences could be detected, I sought to determine whether these differences could be accounted for by gender orientation beliefs.

Throughout the study I used motivational constructs in a manner consistent with its definition and use in the construct's theoretical home.

Research Questions

Using previous research on help-seeking as a starting point, I pose three research questions. Through these questions, I investigated the relationship between help-seeking and motivation, gender and ethnicity, and gender orientation. Help-seeking scales with strong empirical qualities were required to answer these questions. Because such scales were not available in the literature, especially as regards instrumental help-seeking and executive help-seeking, a prerequisite to answering the research questions was to construct appropriate scales with which to measure these key constructs. The three research questions are presented below in literary form.

1. To what degree do computer science grade self-efficacy, computer science self-concept, computer science anxiety, achievement goals in computer science, self-efficacy for self-regulation, value of computer science, and computer science achievement make an independent contribution to the prediction of executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking?

2. Do mean scores in executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking scales differ by gender and/or by ethnicity?

3. Are gender differences in executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking a function of gender orientation beliefs?

Significance of the Study

The area of academic help-seeking is ripe with research opportunities. The relationships between academic help-seeking and self-perception of competence, self-concept, and gender have not been firmly established. Other correlates such as value and gender orientation need to be examined closely to confirm research hypotheses. The most basic hypotheses in academic help-seeking, those of vulnerability and consistency, deserve further scrutiny, at a minimum to establish under which conditions each will apply. The current research addresses each of these areas. Researchers would also do well to consistently incorporate the notions of instrumental and executive help-seeking into their studies. More can be gleaned by knowledge of the type of help sought than can be gained from simply knowing that certain individuals seek help under certain conditions. This would allow researchers to move in the productive direction of identifying those students who underutilize or overutilize help. Again, the current study incorporates this distinction. Further research is also called for in naturalistic settings. Many help-seeking studies are conducted in laboratory settings. Although these studies are valuable, they may or may not reflect the reality of day-to-day life in the classroom. The current study reflects actual classroom conditions.

Research involving achievement goals and help-seeking should certainly incorporate both performance-avoid and performance approach goals. Because help-seeking researchers generally incorporate many of the concepts from the field of motivation, they should pay particular attention to defining their variables so as to avoid any possible confusion due to lack of consistent terminology. This study addresses goals at the current level of understanding.

In many studies on academic help-seeking, self-beliefs have been operationalized according to the conception of different theoretical camps. This has made comparison across studies difficult. In this study I operationalize and use motivational constructs in a manner consistent with that construct's theoretical home.

Prior studies on academic help-seeking have used scales that are problematic, both psychometrically in terms of low alpha coefficients and coneptually in terms of a misalignment with the definition or in terms of missing items. In this study I create new help-seeking scales for instrumental help-seeking and executive help-seeking and adapt scales for both avoidance of help-seeking and perceived benefits of help-seeking.

A study on academic help-seeking in the high school computer science classroom is both necessary and appropriate. Computer labs in particular, characterized by significant amounts of interaction among students and between teacher and student, are a natural area for researchers interested in help-seeking (Schofield, 1995). In addition, no other study has examined the list of motivational correlates that I investigate. Gender findings in academic help-seeking have been inconclusive. This study, of a course generally considered a male domain, should help researchers clarify conceptions of gender and help-seeking. Furthermore, an explanation of gender differences in help-seeking that encompasses gender orientation would clarify the issue for researchers. Findings relating academic help-seeking with ethnicity have been sparse. Finally, I discuss implications that findings from this line of research have for high school computer science teachers, and I include methods that teachers should find fruitful in encouraging their students to become better seekers of adaptive help.

Definition of Help-Seeking Constructs

The following definitions for the help-seeking constructs are used throughout the study.

Instrumental help-seeking is characterized by "those instances in which the help requested is limited to only the amount and type that is needed to allow the child to solve the problem or attain the goal in question for himself or herself" (Nelson-Le Gall, 1981). Instrumental help-seeking is also often referred to as adaptive help-seeking by some researchers (e.g., Newman, 1990).

Executive help-seeking is evident in help-seeking situations in which "the child's intention is to have someone else solve a problem or attain a goal on his or her behalf. Such bids for assistance may include those in which the help sought is not needed for the child to solve the problem" (Nelson-Le Gall, 1981).

Avoidance of help-seeking "refers to instances when a student needs help but does not seek it" (Ryan & Pintrich, 1997, p. 329).

The *perceived benefits of help-seeking* are the positive ramifications of seeking help on a task, from an individual perspective (Newman, 1990; Ryan & Pintrich, 1997).

Limitations and Delimitations

One limitation of this study is that the data consist of student self-reports. Students may not answer honestly, and they may not see their unique self-beliefs represented in the statements they read. To address this limitation I assured students that their responses would be confidential and that only aggregate data would be used. Construct validity is another possible limitation, as inferences that will be made are only valid if constructs are properly operationalized. There is adequate literature addressing the

shortcomings of self-report data; the reader is cautioned to keep these in mind as findings are reported and interpreted.

Because this study is correlational, the reader is also cautioned against making inferences of causation. The relationships hypothesized between help-seeking and other variables reflect the line of inquiry, and therefore the statistical model is naturally dependent upon this interpretation. Therefore interpretations must be both careful and modest. Nevertheless, a strong line of inquiry naturally leads to a solid foundation for the study.

In this dissertation I do not review studies related to group interaction because most help-seeking in computer science classrooms is not situated within a setting of group work (Pea & Kurland, 1983). Because my primary interest is help-seeking in school settings, I also limit discussion to academic help-seeking, which I define as students requesting aid on academic tasks. Although numerous variables are likely to play a role in academic help-seeking, I limit my analysis to the relationship between academic help-seeking and motivational factors that have been identified as strong influences on academic achievement (F. Pajares, personal communication, November 1, 2000; Pintrich & Schunk, 1996), gender, and gender orientation.

CHAPTER II
REVIEW OF THE LITERATURE

In this chapter I first discuss how academic help-seeking has been conceptualized and measured. I then synthesize the research findings relating academic help-seeking to self-perception of competence, self-concept, achievement goal orientation, motivational orientation, attributional style, perceptions of value, self-regulation, gender, ethnicity, and developmental level. This chapter concludes with a brief synthesis of the findings and a description of the ideal seeker of adaptive help.

Nelson-Le Gall (1981) identified a number of factors that should correlate with academic help-seeking. These include the age and gender of the helper and of the helped student, the organization of the classroom, the structure of the task, a teacher's encouragement of help-seeking, the helped student's perceptions of classroom norms regarding help-seeking, and characteristics of the helper such as willingness and ability. She also stressed the social nature of help-seeking, which to a large extent sets it apart from other achievement strategies that are more self-regulatory in nature (Newman, 1991).

Since Nelson-Le Gall's (1981) distinction between instrumental and executive help-seeking, researchers have attempted to link motivational constructs with characteristics of the adaptive or maladaptive help-seeker (Newman, 1991). Researchers

have also considered the role of gender, ethnicity, and development in academic

help-seeking (Nadler, Maler, & Friedman, 1984; Newman & Wick, 1987).

Conceptualization and Measurement of Help-Seeking

Although various types of help-seeking constructs are represented and assessed in

the help-seeking literature, four have predominated. They are instrumental help-seeking,

executive help-seeking, avoidance of help-seeking, and perceived benefits of help-

seeking. As I explained in Chapter 1, a number of researchers have included some form

both of instrumental help-seeking and executive help-seeking. Recall that instrumental

help-seeking entails a desire to seek only as much assistance as necessary to complete the

task, whereas executive help-seeking represents a request for someone else to complete a

task.

Instrumental help-seeking has been assessed on self-report instruments with items

such as "Getting help would be one of the first things I would do if I were having trouble

in this class"; "Before I ask for help with my math work, I think about what kinds of

questions to ask"; and "If I get stuck on a math problem, I ask someone for help so I can

keep working on it" (Arbreton, 1993; Karabenick, 2001; Ryan & Pintrich, 1997). The

number of items on instrumental help-seeking scales has ranged from 2 to 5, and alpha

coefficients have ranged from .62 to .77 (Arbreton, 1993; Karabenick, 2001; Ryan &

Pintrich, 1997).

Executive help-seeking has been assessed with items such as "I often ask the

teacher for help in math before I try the work on my own"; "I get the teacher to help me

with my math work so that I can finish quickly"; "If I don't understand something in math,

the first thing I do is ask the teacher to give me the answer"; and "The purpose of asking

somebody for help in this class would be to succeed without having to work as hard."

(Arbreton, 1993; Karabenick, 2001). The number of items on executive help-seeking

scales has ranged from 2 to 4, and the alpha coefficients have ranged from .53 to .78

(Arbreton, 1993; Karabenick, 2001; A. Ryan, personal communication, May 11, 2001).

A third construct prominent in the help-seeking literature is avoidance of help-

seeking, which "refers to instances when a student needs help but does not seek it" (Ryan

& Pintrich, 1997, p. 329). This construct has been measured on self-report instruments

with items such as "If I need help to do a math problem I skip it"; "I only ask for help

with my math work if the teacher makes me ask for help"; and "If I can't do a difficult

math problem by myself, I ask my teacher to help me get started on it" (reverse coded)

(Abreton, 1993; Ryan & Pintrich, 1997). The number of items on avoidance of help-

seeking scales has ranged from 3 to 6, with alpha coefficients ranging from .60 to .80

(e.g., Arbreton, 1993; Karaenick, 2001; Middleton & Midgley, 1997; Ryan et al., 1998;

Ryan et al., 1997; Ryan & Pinctrich, 1997). .

Also prominent in the help-seeking literature is perceived benefits of help-

seeking, which are the positive ramifications of seeking help on a task, from an individual

perspective. This construct has been measured with items such as "I think that asking the

teacher questions helps me learn math" and "Asking questions in math makes the class

more interesting for me" (Newman, 1990; Ryan & Pintrich, 1997). The number of items

on perceived benefits of help-seeking scales has ranged from 3 to 5, with alpha

coefficients ranging from .65 to .79 (e.g., Newman, 1990; Newman & Goldin, 1990;

Ryan & Pintrich, 1997).

As is readily evident, reliability indexes for each of these four help-seeking scales have been low to moderate. More important, conceptual problems call into question the construct validity of some of the items. For example, "Getting help would be one of the first things I would do if I were having trouble in this class," an item purporting to measure instrumental help-seeking, provides a better assessment of avoidance of help-seeking (reverse scored) than it does of seeking instrumental help. One cannot infer from that item the type of help the student would seek if he or she were having trouble in class. A student could respond to that item positively even though the type of help that student would likely seek might be of the executive type. The same may be argued about the instrumental item, "Before I ask for help with my math work, I think about what kinds of questions to ask." A student could easily respond positively to this prompt, leading the researcher to score it as a positive instrumental response, whereas the "kinds of questions" the student may ask are executive-type questions such as "Can you tell me the answer to problem 5?" Problematic wording also helps to confound items. The instrumental help-seeking item "If I get stuck on a math problem, I ask someone for help so I can keep working on it" embeds the non-sequitur of "asking for help *so as to* keep working" on the problem and its wording seems awkward enough to likely confuse a respondent.

Conceptual problems also beset the executive help-seeking items. For example, the item "I often ask the teacher for help in math before I try the work on my own" is used to measure executive help-seeking. In this case, it is possible for a student to ask the teacher for instrumental help before trying the work on his or her own. In other words, if a student asked the teacher, "Could you show me problems similar to these?" the student

would clearly be seeking instrumental help. Nonetheless, a high response to this item

would be considered executive help-seeking. Similarly, the executive help-seeking item

"The purpose of asking somebody for help in this class would be to succeed without

having to work as hard" confounds the intention to seek executive help with academic

engagement. Similarly, the executive help-seeking item "I get the teacher to help me with

my math work so that I can finish quickly" more reasonably reflects a student's desire to

finish quickly than it reflects a desire to seek executive help. Certainly one could argue

that a student could well seek instrumental help so as to finish quickly. In these items, and

others like them, a student's intention to seek executive help is confounded with a host of

other factors. Look also at the executive item "If I don't understand something in math,

the first thing I do is ask the teacher to give me the answer." Students who want answers

provided when they seek help are clearly seeking executive help. Seeking that help,

however, may not be "the first thing" they do. It may be the second, or the third, or the

fourth. Consequently, a low rating on this item may not at all suggest that the student

does not seek executive help. It simply suggests that seeking executive help is not the first

self-regulatory strategy that comes to their mind. It is no small surprise, then, that

reliability indexes have been as low as .53.

Items used to assess avoidance of help-seeking and perceived benefits of help-

seeking are not so conceptually problematic. Nonetheless, the low to moderate

reliabilities reported by researchers suggest both that the wording of items should be

carefully explored and that longer scales would be beneficial.

For these reasons, it seems clear that help-seeking researchers would profit from

new scales measuring instrumental help-seeking and executive help-seeking as well as

from adaptations of the avoidance of help-seeking and perceived benefits of help-seeking

scales. Until that is accomplished, problems related to the confounds, poor reliabilities,

and problematic construct validity of existing scales are likely to prevent researchers from

providing clear, consistent, and valid findings regarding these constructs.

Self-Perception of Competence

One of the constructs that has received attention from academic help-seeking

researchers deals with students' beliefs about their own capabilities, or perceptions of

competence (Butler, 1998). These beliefs travel under various names: expectancy beliefs,

task-specific self-concept, perceptions of competence, self-perceptions of ability, and

subjective competence, to name a few (Pajares, 1996b). For purposes of my review I refer

to students' beliefs about their capabilities as self-perceptions of competence.

Proponents of the *vulnerability hypothesis* contend that students with low

self-perceptions of competence are unlikely to seek help because this admission of failure

makes it difficult to maintain an impression of competence. Those who support the

consistency hypothesis argue that students with high self-perceptions of competence tend

to ask fewer questions because the admission that they need help is inconsistent with their

self-views of competence (Butler, 1998). Some researchers have argued for a quadratic

relationship between academic help-seeking and self-perceptions of competence such that

those at intermediate levels of self-perceptions of competence will seek help most often.

Some findings support this contention (Karabenick & Knapp, 1988b).

In short-term experimental research, the consistency hypothesis has received

support (Nelson-Le Gall, DeCooke, & Jones, 1989; Nelson-Le Gall, Kratzer, Jones, &

DeCooke, 1990). Students with low self-perceptions of competence seek more help than

do students with high self-perceptions of competence. Some of this may be attributable to the higher perceived need for help of students low in self-perception of competence; students seek more help when they think their answers are incorrect than when they believe their answers are correct (Nelson-Le Gall & Jones, 1990). Students who have high self-perceptions of confidence may also believe that their classmates are incapable of helping them (Nelson-Le Gall, 1985).

Many researchers argue, however, that in the long run students with low self-perceptions of competence ask fewer questions and are involved less in help-seeking throughout their schooling than are students with high self-perceptions of competence (Kennedy, 1997; Newman, 1990; Ryan et al., 1998; Ryan & Pintrich, 1997; Urdan, Midgley, & Anderman, 1998; Zimmerman & Martinez-Pons, 1990). Students with low self-perceptions of competence feel more threatened when seeking help, have worse attitudes about seeking help, are more aware of the costs associated with help-seeking, engage in more self-handicapping strategies such as avoiding help-seeking, and are worse self-regulators in terms of seeking help. They also seek less adaptive help than do students with high self-perceptions of competence, asking more unnecessary questions (Newman, 1991; Ryan & Pintrich, 1997). When students with high self-perceptions of competence experience the need for help, they are more likely to seek it (Karabenick & Sharma, 1994b; Newman & Schwager, 1992). Some researchers suggest that students with low self-perceptions of competence might raise these perceptions by getting help and consequently succeeding (Ames, 1983). This notion does not imply that students with high self-perceptions of competence will not also seek help.

Some researchers argue that actual competence rather than the perception of competence acts as the impetus for help-seeking (Ames & Lau, 1982; Good, Slavings, Harel, & Emerson, 1987; Newman & Goldin, 1990). Researchers have also argued that students who are more talented academically have a better understanding of when they need help and ask better questions when they do seek help (Butler, 1998; Butler & Neuman, 1995). A similar argument has been made for students who are more socially adept having an advantage in the social process of help-seeking over those who are shy or less socially adept (Salomon & Strobel, 1997). A cautionary note has also been sounded, because more capable students may have fewer questions and therefore their willingness to engage in help-seeking may be undercounted (Karabenick & Knapp, 1991).

Nonetheless, researchers have tended to be more interested in the students' own perceptions of their academic talents, arguing that it is this construct that affects whether help-seeking ever takes place (Butler, 1998). Furthermore, researchers have argued that self-perceptions of competence are more important than competence per se in academic help-seeking and in motivational studies in general (Bandura, 1997; Nelson-Le Gall et al., 1990; Nelson-Le Gall & Jones, 1990; Urdan et al., 1998). This is partly because competence itself is open to different interpretations by different individuals. Students with similar competence levels will decide whether they will engage in help-seeking based on their perceptions rather than on objective competence. Students who are overly confident may not seek help even when it is objectively warranted, whereas students who lack confidence may seek help unnecessarily (Ames, 1983). Furthermore, it is the perception that an idea has been misunderstood or a performance has been poor that typically initiates help-seeking (Newman, 1994).

Recently, Butler (1998) argued that a critical mediating variable between ability perceptions and help-seeking is typically disregarded: threat to perceptions of ability. Butler contended that help-seeking is not moderated by perceived competence, but rather by the perception that one's beliefs about one's academic talents may not be aligned with reality. She argued that researchers have not focused on this variable and have in fact focused on the wrong variable. Her own findings relating help avoidance orientations with help-seeking styles have lent support to her contentions. Butler found that students with ability focused orientations to help-avoidance were least likely to seek help across all levels of perceived competence when compared with students holding expedient and autonomous orientations.

No consensus has yet been reached on the relationship between self-perceptions of competence and academic help-seeking. In short term experimental research, students with low self-perceptions of competence have been shown to seek more help (Nelson-Le Gall et al., 1989). However, students with high self-perceptions of competence appear to be more willing to seek academic help when it is needed over the course of their academic careers (Newman, 1990; Ryan & Pintrich, 1997). If indeed students who lack confidence are least likely to seek help over the course of their schooling, then there is cause for concern that the students who may need the help most are least likely to request it (Newman & Schwager, 1993).

Self-Concept

Researchers typically define self-concept in academic contexts as students' judgments of their self-worth in an academic area (Pajares, 1996b). In essence self-concept beliefs are self-perceptions of competence, with the only distinction being

that self-concept includes the affective component of self-worth. Some researchers have argued that self-concept has often been assessed as a global self-belief that has limited utility (Bandura, 1997; Pajares, 1996b; Schunk, 1991). However much of the literature on academic help-seeking has looked at variables such as self-esteem, a variable closely related to general self-concept, so an overview of the relationship between self-concept and academic help-seeking is both warranted and appropriate.

Researchers who examine the relationship between self-esteem and help-seeking focus on the threat to self-esteem that is presumed to be part of the help-seeking experience (Grayson, Miller, & Clarke, 1998; Nadler, 1986b). Students who seek help admit that they cannot complete the task alone, violating the Western ideal of independence (Nadler, 1997). If students fail even after seeking help, their feelings of self-worth diminish even further (Karabenick & Knapp, 1988b). Just as with self-perceptions of competence, self-esteem proponents argue for either the consistency hypothesis or the vulnerability hypothesis.

Some researchers argue that students with low self-esteem fear further threat to their self-esteem by admitting failure on a task and therefore avoid seeking help (Karabenick & Knapp, 1991; Newman & Schwager, 1993). These students exhibit an avoidant style, seeking less instrumental help and even lowering their future ambitions (Karabenick & Knapp, 1991). It has been suggested that the vulnerability hypothesis is more likely than the consistency hypothesis when the cost of not seeking help is high, when the setting is task-oriented, and in school contexts over long time periods (Karabenick & Knapp, 1991; Newman, 1991).

Other researchers contend that students with high self-esteem shelter themselves from conceptions of failure inconsistent with their self-beliefs by avoiding help-seeking (Nadler, 1987; Nadler, Mayseless, Peri, & Chemerinski, 1985). High self-esteem students are especially unlikely to seek help when the helper is similar to them, the setting is performance-oriented, or there is no opportunity for reciprocity. The consistency hypothesis has been supported in laboratory studies under conditions of high threat (Nadler, 1991).

Nadler (1997) proposed a conceptual model in which students high in self-esteem would be more likely than those low in self-esteem to seek help when hints were available, but the opposite would be true when only answers were available. When hints are available, high self-esteem students are able to engage in help-seeking while still largely retaining their autonomy. When only answers are available, high self-esteem students underutilize help to avoid appearing dependent whereas low self-esteem students will still seek aid. Low self-esteem students in this situation overutilize help, which may keep them in a dependent role in the future.

If recipients of help are going to wean themselves of the need for future help, they must want to do so and they must believe that they can do so (Nadler, 1986b; Nadler & Fisher, 1986). The more threatening the help, the more motivated an individual is to end the dependence on help. However, if the help is threatening but an individual does not feel in control, that person will end up feeling helpless.

Many factors affect the amount of threat to self-esteem that is associated with seeking help. Students are more likely to seek help from a computer rather than from another person because the greater privacy allows students to avoid the negative social

consequences of seeking help (Karabenick & Knapp, 1988a). For example, kibbutz students have a better attitude toward help-seeking because the culture in which they are raised puts less emphasis on self-reliance and individual achievement than does Western culture (Nadler, 1986a). Students are more likely to ask a question if they do not perceive themselves as being alone in experiencing difficulty (Newman & Schwager, 1993). Students also feel more threatened asking for help from peers rather than from teachers because they do not view providing help as the responsibility of their classmates and because their classmates are more likely to question their competence. Students with performance goals, particularly low achievers, and students who want to be friends with a popular group of classmates perceive more threat and seek less academic help (Ryan et al., 1997). Finally, because male students and older students value their independence more than do female and younger students, the self-esteem of male students and older students will be more threatened by seeking help (Nadler, 1991).

Nelson-Le Gall (1985, 1986) has been critical of self-esteem theories of help-seeking. She suggests that self-esteem theories must exclude young children because they have not yet developed a general sense of self. Ames (1983) and Nelson-Le Gall also question the single direction implied by self-esteem theories that level of self-esteem will affect help-seeking but not vice versa. Instead they suggest that successfully seeking help may raise both achievement and self-esteem, implying a reciprocal relationship between self-esteem and help-seeking. Nelson-Le Gall (1986) further questions both the global nature and stability of self-esteem, particularly in young children.

In summary, researchers have failed to reach consensus on the relationship between self-concept and academic help-seeking. The focus of much of the research has

been on the threat to self-esteem that is presumed to be present when students seek aid. Both contextual factors, such as the culture and location of the classroom, and personal factors, such as goals, gender, and age, affect the amount of threat associated with a help-seeking episode. Over the long term in a school context, the vulnerability hypothesis appears to be most valid for many of the same reasons that this hypothesis applies to self-perceptions of competence (Karabenick & Knapp, 1991).

Achievement Goal Orientation

A student's achievement goal orientation is that individual's reason for involvement in an academic task (Pintrich & Schunk, 1996). Task-goals (also known as learning goals or mastery goals) involve the desire of students to understand and master a task for its own sake (Elliott & Harackiewicz, 1996). Performance-approach goals involve the desire of students to be deemed competent. Performance-avoid goals involve the desire of students to avoid being deemed incompetent. These goal orientations affect the way that a student behaves in an achievement setting (Pintrich & Schunk, 1996). A task goal orientation has typically been found to be beneficial for student performance and motivation, whereas a performance-avoid orientation is detrimental (see Pajares, Britner, & Valiante, 2000; Urdan & Maehr, 1995). The role of performance-approach goal orientations is still to be determined. Researchers have argued that achievement goals should be taken into account when making predictions of frequency of help-seeking (Newman, 1998; Ryan & Pintrich, 1997).

Until recently goal theorists and researchers have generally assessed performance goals as a unitary construct, not acknowledging the separate constructs of performance-approach and performance-avoid goals (Elliott & Harackiewicz, 1996).

Most researchers believed that the distinction between task-goals and performance-goals would adequately explain differential help-seeking. However, Elliott and Harackiewicz not only demonstrated experimentally that performance-avoid and performance-approach goals are separate but also found that the distinction between approach and avoid has important explanatory power. As a consequence, most of the research on achievement goals and help-seeking that has been conducted during the past two decades must be understood with this distinction in mind.

Research on achievement goals and help-seeking has focused on two types of achievement goals, contextual achievement goals (in non-laboratory settings known as classroom goal structures) and individual achievement goals (e.g., Middleton & Midgley, 1997; Nadler, 1987). Contextual achievement goals are rooted in the environment of the classroom or the task, whereas individual achievement goals are student self-beliefs. When researchers employ contextual achievement goals, they manipulate the setting to either encourage participants to feel that they are competing against others (performance goals) or to encourage participants to want to master a task for its own sake (task goals). Individual achievement goals are generally self-reported by students.

Most studies attempting to link contextual achievement goals and academic help-seeking have been conducted under conditions of performance orientation. Under this orientation, researchers generally predict that overall help-seeking attempts will decrease but that executive help-seeking will increase (Magnusson & Perry, 1992). Because executive help-seeking is operationalized as an individual preference for answers over hints, participants in performance-oriented settings are more likely to request answers than hints. Perceived threat to competence is high under conditions of

performance orientation (Butler, 1998; Nadler, 1987). Performance-oriented settings may even promote cheating among certain groups of individuals. Students who believe that classroom goals emphasize relative ability avoid seeking help (Ryan et al., 1998), and these students explain their reason for avoiding help as hiding their inability (Butler & Neuman, 1995). In performance-oriented settings, students with high self-esteem are particularly unlikely to request help (Nadler, 1986b, 1987), as are students with particularly high or low skill levels (Butler & Neuman, 1995).

Under conditions of task-orientation, findings typically show that overall help-seeking and instrumental help-seeking increase (Magnusson & Perry, 1992). Hence participants are more likely to request hints than answers. Perceived threat to competence is low under conditions of task-orientation (Butler, 1998; Nadler, 1987), and students who avoid seeking help do so because they want to master the task on their own. Help-seeking in task-oriented settings is not moderated by skill level (Butler & Neuman, 1995). Students who believe that their classrooms focus on improvement do not avoid seeking help when needed (Ryan et al., 1998).

When individual achievement goal orientations are studied, researchers expect students with performance goals to perceive help-seeking as threatening and therefore to avoid it, whereas students with task goals are not expected to view help-seeking as threatening and therefore to seek adaptive help as needed (Ryan et al., 1997; Ryan & Pintrich, 1997; Ryan, Pintrich, & Midgley, 2001). When performance goals are split into approach and avoid, performance-avoid goals are viewed as the strongest indicators of the likelihood that students will avoid seeking help (Middleton & Midgley, 1997).

Performance-approach goals do not have the predictive power of performance-avoid goals in terms of intentions to seek help.

Newman (1998) investigated the relationship between contextual achievement goal orientation and individual achievement goal orientation. As expected, he found that individual task-goals positively affect instrumental help-seeking in the form of answer confirmation requests, whereas individual performance-goals have the opposite effect. For an individual with a strong performance-goal orientation, a task-related context will be more conducive to instrumental help-seeking than will a performance-related context.

In summary, achievement goal orientation plays an important role in academic help-seeking. Newman (1998) included both contextual and individual achievement goal orientations in his research in an attempt to cohesively integrate the two in an understanding of academic help-seeking. Although little research has been done separating performance-avoid and performance-approach goals, task goals are typically viewed as contributing positively to adaptive help-seeking whereas performance goals are not. Studies that include both performance-approach and performance-avoid goals should produce more precise insights about academic help-seeking.

Motivational Orientation

Motivational orientation also plays an important role in academic help-seeking (Newman, 1990; Newman & Schwager, 1992). Motivational orientation is the motivation to engage in a particular task (Pintrich & Schunk, 1996). An individual with an intrinsic motivation will be motivated to engage in the task for its own sake, whereas an individual with an extrinsic motivational orientation will be motivated to become involved with the task as a means to an end. These orientations are contextual and may vary by subject area.

There is in fact a great deal of overlap between motivational orientation and achievement goal orientation, and historical underpinnings appear to play a substantial role in the separation of these constructs.

Motivational orientation has a clear relationship with academic help-seeking (Newman, 1991, 1994). If students prefer challenges, which is characteristic of intrinsically motivated individuals, they are likely to seek help (Newman, 1990). Students with intrinsic motivational orientations prefer indirect help in the form of hints rather than direct help in the form of answers, whereas students with extrinsic orientations, who are generally overly dependent on others, have no preference between hints and answers (Nelson-Le Gall & Jones, 1990; Newman, 1991). Students with intrinsic orientations perceive their teachers to be more supportive of student questions than do students with extrinsic orientations (Karabenick & Sharma, 1994a).

Some researchers have suggested a more complicated relationship between motivational orientation and help-seeking that is dependent on developmental level (Newman, 1990). Students in Grades 3 and 5 report seeking help more often when they prefer to be challenged and when they are dependent on the teacher, intrinsic and extrinsic reasons respectively. Students in Grade 7 report seeking help more often when they prefer to be challenged and when they prefer to master tasks independently, both intrinsic reasons. This would suggest that some extrinsic reasons may promote help-seeking at lower levels of development. Some caution should be taken in generalizing from these findings, however, because instrumental and executive help-seeking have not been differentiated.

Researchers have also argued that motivational orientation can be affected by cultural upbringing and by the nature of the task. For example, kibbutz-dwelling students seek more help than do city-dwelling students when working on group tasks, but the situation is reversed when working on individual tasks (Nadler, 1986a). In both cases those students with higher levels of motivation to achieve seek more help. Kibbutz-dwelling students in general seek more help than do city-dwelling students, perhaps due to the norm of communal values, as opposed to individual achievement values, typically found on kibbutzim.

Butler (1998) proposed that three reasons for help-avoidance lead to different help-seeking behaviors in the classroom. An autonomous orientation to help-avoidance, wanting to work alone rather than exhibit dependent help-seeking, leads to instrumental help-seeking patterns. An ability-focused orientation to help-avoidance, wanting to avoid asking for help because this threatens their self-perceptions of competence, leads to executive help-seeking patterns. An expedient orientation to help-avoidance, not asking for help because it will not aid in finishing the task, leads to an "avoidant-covert" style of help-seeking in which students secretly look at the work of others. Butler's own findings support the existence of these orientations and their subsequent effect on help-seeking behavior. In particular, ability-focused students at all levels of perceived competence seek the least help.

Attributional Style

Attributional, or explanatory, style is an individual's style of explaining why events occurred (Pintrich & Schunk, 1996). It is important to make the distinction that this is not necessarily the reason that the events actually happened; rather it is the

individual's perception of the cause. For example, a student may attribute failure on a task to lack of ability when in fact the cause may have been lack of effort. Typically distinctions are made between attributions along three dimensions: locus, stability, and controllability (Weiner, 1980a, 1980b). Locus is typically judged as either internal or external to the individual. Stability is judged on whether the cause of the event remains the same across time and across situations. Finally, controllability indicates whether or not an event was under the person's control. Lack of ability may be seen as internal, stable, and uncontrollable, whereas lack of effort may be seen as internal, unstable, and controllable (Weiner, 1994).

Students' attributions play a role in determining help-seeking patterns. Students who believe that their behavior affects school outcomes are more motivated to learn, perform well, and seek help (Newman & Schwager, 1992). Students who believe that luck is important in an academic setting but consider themselves unlucky feel powerless to control their environments and therefore are not likely to seek help. If they do choose to seek help, however, the perceived external cause of failure allows that person to seek help without embarrassment (Shapiro, 1983). If students believe that the cause of needing help is under their internal control, on the other hand, they are more likely to seek help but may be embarrassed to do so.

Competitive environments lead to decreased help-seeking because they cause students to focus on their ability and external, uncontrollable factors (Ames, 1983). Children in this setting are focused on performance goals. On the other hand, students in noncompetitive environments are able to concentrate on their internal efforts and improving their previous performance.

Students who witness peers receiving unsolicited help judge the helped student as low in ability (Graham & Barker, 1990). This is because help is likely to be extended when lack of ability is the perceived cause rather than lack of effort (Schmidt & Weiner, 1988). Students who believe that a classmate needs help because of a problem beyond that individual's control (such as lack of ability) are likely to feel sympathy for that person and grant help; however, if that student needs help because of a controllable problem (such as laziness) the same classmates are likely to become angry and refuse to help (Weiner, 1980a). This suggests that teachers offering unsolicited aid to students may in fact lead helped students to believe that they are not capable and may ultimately inadvertently lead to help-irrelevant beliefs (Ames, 1983; Graham & Barker, 1990).

Students who attribute failure to lack of effort are more likely to adopt active, adaptive coping strategies such as seeking help than are students who attribute failure to lack of ability (Ames & Lau, 1982). However, students who acknowledge that they need help may not seek it because they believe that they should have tried harder on their own (Knapp & Karabenick, 1988). Students who attribute failure to low ability are most at risk in the standard, ego-involved classroom; ability-attribution students working alone on an analytical reasoning task ask for less instrumental help and more executive help under conditions of ego-involvement than under conditions of task-involvement (Magnusson & Perry, 1992). If students are under the impression that others find them capable of completing a task, however, they may be embarrassed at seeking help (Shapiro, 1983).

Students who believe that ability is stable over time are likely to adopt performance goals, whereas students who believe that ability can grow over time are likely to adopt task goals (Nelson-Le Gall, 1985). Students with an entity conception of

ability feel less in control of their environments than do students with an incremental

conception of ability. As discussed earlier, the adoption of task goals rather than

performance goals is more likely to result in adaptive help-seeking (Ryan et al., 1997;

Ryan & Pintrich, 1997).

Ames (1983) described four attributions that he deemed "help-relevant

attributions." Students make these attributions after they have completed a task. For

example, when students assess their performance on an examination, they will consider

whether they studied adequately in preparation. Help-relevant attributions include

confidence in their ability, the awareness that they did not understand aspects of the

particular task, the belief that they did not put forth enough effort on the task, and the

view that external factors such as luck were not to blame for failure on the task. These

internal, controllable, stable attributions are all help-relevant because students who hold

these beliefs are more likely to seek help on subsequent tasks. "Help-irrelevant

attributions" also include confidence in ability (although slightly less confidence than

with help-relevant attributions) and the awareness that they did not understand aspects of

the task, but these two attributions are supplemented by the belief that they did not have

the ability to accomplish this particular task and the placing of blame on other factors.

This excuse-making is a self-defeating strategy necessary so that an overall belief in one's

ability does not suffer. These internal, uncontrollable, stable attributions are

help-irrelevant because students who hold these beliefs are less likely to seek help on

subsequent tasks.

Less competent students are more likely to make help-irrelevant attributions than

are more competent students (Ames & Lau, 1982). Less competent students are also more

likely to make help-irrelevant rather than help-relevant attributions. This may be explained by a student's formation of stable low ability attributions over time, leading to a feeling of powerlessness (Karabenick & Knapp, 1988b). If a student with low ability attributions asked for help and still failed at the task, that student's self-worth would dip even further. Female students are more likely than male students to make help-irrelevant attributions, and female students are more likely to make help-irrelevant attributions than help-relevant attributions (Ames & Lau, 1982).

In summary, students who attribute failure to lack of effort, have overall confidence in their abilities, and believe that the failure is attributable to reasons under their control are likely to seek help as needed (Ames, 1983). Students who attribute failure to lack of ability and blame external factors for their failure are less likely to seek adaptive help as needed. The primary differences between these types of students are the dimensions of stability and controllability. Classmates are willing to help students who are perceived to have exerted effort themselves but are less likely to help students who are perceived not to have tried (Schmidt & Weiner, 1988). Finally, students believe that classmates who receive unsolicited help are generally low in ability (Graham & Barker, 1990).

<div align="center">Perceptions of Value</div>

Individuals prioritize their goals relating to academic achievement (Ames, 1983). Often students may be more interested in one academic subject than in another, or they may believe that a particular subject is more important to their future plans than are other subjects. When students value a particular academic area, they may be willing to do whatever is necessary to achieve success in that area, including seeking help. However, a

student may be embarrassed to admit a need for help in an area of importance (Shapiro, 1983). Finally, because seeking help and still not succeeding is more damaging to students' sense of self-worth than not seeking help at all, they might not seek help but instead might create excuses for failure to protect their sense of self-worth (Butler, 1998; Karabenick & Knapp, 1988b).

When students do not value an academic area, they will be less willing to invest energy in it and therefore less likely to seek help (Ames, 1983). Because they have invested less of their self-worth in success in that particular field, there is less incentive to seek help. Of course these academic value beliefs will interact with a student's attribution style, achievement goals, and perception of academic competence in a way that makes predictions difficult.

It has been suggested that due to sex-role socialization in the United States girls and boys may attach value to different academic subjects (Good & Slavings, 1988). For example, girls may attach more value to reading than do boys. Thus the increasing passivity of girls in mathematics classrooms and boys in language arts classrooms may be partially attributable to possessing differing value systems. It seems logical that the more value students place on achievement and the greater the cost of a poor performance the more likely students are to seek adaptive help (Karabenick, 1990). The findings of Nelson-Le Gall and Glor-Scheib (1985) that students seek more executive help and less instrumental help in their respective sex-typed classrooms (i.e., girls in reading, boys in mathematics) therefore come as a surprise. Their findings may have limited generalizability, however, due to the observed sample size of less than 60 students and the recommendation of the researchers themselves for replication on a larger scale.

Newman (1991) has suggested another possible explanation for this finding. Students may be willing to seek help in academic subjects that are perceived as difficult—regardless of the value they place on the area of study—because their self-worth is not diminished by asking for help in such a situation. In fact students will be most likely to seek help in a situation in which the task is quite difficult and they truly desire a solution, so there may be an interaction occurring between value and task difficulty.

Ames (1983) described a model in which both the student and the situation determine the value a student places on success in a particular academic area. Students receive an indication of the success or failure of their performance. Their attributions will operate in concert with that realization. The student then decides whether or not to seek help. This type of model shows the complex interactions that take place when a student decides whether or not to seek help in an academic context.

Although intuitively it seems that students would seek more help and more adaptive help in an academic subject that they value than in an academic subject that they do not value, researchers have obtained mixed results (Good & Slavings, 1988; Karabenick & Sharma, 1994a; Nelson-Le Gall & Glor-Scheib, 1985). Certainly this is an underexplored area of research on academic help-seeking. Future research should determine which academic subjects individuals value before attempting to make a firm connection with help-seeking. Value may also be particularly difficult to separate from other personal and contextual correlates of academic help-seeking.

Self-Regulation

In schooling, self-regulation is the process of regulating one's behaviors, thoughts, and emotions when working toward academic tasks (Pintrich & Schunk, 1996; Stipek, 1998). Because students want to successfully complete these tasks, they will use self-regulated learning strategies to assist them (Pintrich & Schunk, 1996). These strategies include such activities as rehearsing, clarifying, setting goals, making connections, and making predictions (Pintrich & Schunk, 1996; Stipek, 1998). A positive association has been established between the use of self-regulation strategies and learning (Stipek, 1998). Help-seeking is also considered a self-regulatory strategy. Researchers have attempted to discover whether there is a connection between help-seeking and other self-regulatory strategies, and they have also studied help-seeking as a self-regulatory strategy itself.

One of the self-regulatory strategies that clearly relates to help-seeking is monitoring; students must monitor their understanding both when they first encounter a new concept and then later when they are tested on the concept (Karabenick, 1990). Students who use other self-regulatory strategies such as monitoring perceive their teachers as supportive of student questioning and seek help when necessary (Karabenick & Knapp, 1991; Karabenick & Sharma, 1994a). These students will seek help from peers, teachers, and other adults and are more likely to seek instrumental help rather than executive help (Karabenick & Knapp, 1991; Karabenick & Sharma, 1994b). These students also are less concerned than are other students about the threat posed to their self-esteem by help-seeking (Karabenick & Knapp, 1991). This does not necessarily mean that students who use other self-regulatory strategies seek more help than do other

students, however, because these students typically have less need for help than do other students. Students who use few self-regulatory strategies need more help but are less comfortable seeking it due to the perceived threat to their self-esteem.

Seeking help from teachers and classmates is itself a self-regulatory strategy (Newman & Schwager, 1992). Help-seeking can be further broken down into other strategies such as (a) realizing that help is needed, (b) deciding to seek help, (c) locating a source of aid, (d) limiting unnecessary questions, and (e) later using the aid received on similar tasks (Nelson-Le Gall & Jones, 1991; Newman, 1994; Puustinen, 1998; Ryan & Pintrich, 1997). Self-regulatory strategies such as these have been shown to increase with corresponding increases in developmental level, academic success, and self-perceptions of competence (Puustinen, 1998; Zimmerman & Martinez-Pons, 1986; Zimmerman & Martinez-Pons, 1990). Competent students ask more necessary questions and fewer unnecessary questions than do less competent students (van der Meij, 1990). Good and Slavings (1988) suggest that female students are less self-regulated in terms of seeking help in mathematics classes than are male students, yet the situation is reversed in language arts classes.

Students who use other self-regulatory strategies tend to seek help when it is needed (Karabenick & Knapp, 1991). They consider both the benefits and the costs of seeking aid, and then they act (Karabenick, 1990). Among the costs of seeking help are threat to a student's self-esteem, embarrassment, performance anxiety, the expectation of reciprocity, and the time and effort involved (DeCooke, 1992, 1997; Karabenick, 1990; Nadler & Fisher, 1986; Shapiro, 1983). The costs of not seeking help include disappointment, a poor performance, failure at the task, and lowered perceptions of

competence (Karabenick, 1990). Students who use self-regulatory strategies "persevere but do not perseverate" (Newman, 1994, p. 298). Once they realize that outside help is needed and that the benefits outweigh the costs, these students seek adaptive, instrumental help. As with other self-regulatory strategies, students who are older, more competent, and have higher self-perceptions of competence tend to better employ these strategies than do students who are younger, less competent, and have lower self-perceptions of competence (Puustinen, 1998; Zimmerman & Martinez-Pons, 1986; Zimmerman & Martinez-Pons, 1990).

Gender

Findings regarding gender differences in academic help-seeking are inconsistent. Some researchers have found support for the contention that female students seek more help than do male students (Butler, 1998; Nelson-Le Gall, 1981; Nelson-Le Gall et al., 1989; Nelson-Le Gall, Gumerman, & Scott-Jones, 1983). Girls are more willing to seek help in both academic and nonacademic settings (Salomon & Strobel, 1997). Girls are less reluctant than boys to seek and receive help when it is needed, although this may in part be explained by differences in achievement (Nadler & Fisher, 1986; Ryan et al., 1997; Ryan et al., 1998). In Grade 7, girls ask more questions than do boys (Good et al., 1987). Researchers have suggested that help-seeking may be seen as more appropriate for girls than for boys because it is consistent with the dependent female sex role; help-seeking may therefore exact less of a psychological cost on girls than on boys (Nadler, 1997; Nelson-Le Gall, 1981, 1985).

However, not all researchers agree that female students are more likely to seek help than are male students. In kindergarten and Grade 1, boys ask more questions, and

the same pattern holds in high school (Good et al., 1987). Boys are less fearful than girls of seeking help from the teacher and are less concerned than girls about negative images and reactions they may provoke in others by seeking help in mathematics classrooms (Kennedy, 1997; Newman & Goldin, 1990; Newman & Schwager, 1993). When controlling for both social and academic goals, boys are less likely than girls to feel threatened by seeking help (Ryan et al., 1997).

Some researchers report no gender differences in students' willingness to seek help (Nelson-Le Gall & Jones, 1990; Newman, 1990; Newman & Schwager, 1993; Ryan & Pintrich, 1997; van der Meij, 1988, 1990). Both male and female students have the same understandings of indebtedness from help-seeking and the reciprocation that is expected (DeCooke, 1992, 1997). This indebtedness is both affective and motivational and is affected quantitatively by both the benefits received by the recipient and the costs incurred by the helper. From Grade 2 through Grade 6, students ask similar numbers of questions (Good et al., 1987) and, in mathematics and reading, they seek similar amounts of help from teachers and peers (Nelson-Le Gall & Glor-Scheib, 1985).

Some researchers report a qualitative difference in help-seeking rather than a quantitative difference. Elementary school students may not differ by gender in the amount of help they seek but rather in the type of help sought (Nelson-Le Gall & Glor-Scheib, 1985). Girls seek more instrumental help and less executive help than do boys in mathematics classes, whereas the reverse is true in reading classes. In laboratory settings, elementary school girls prefer instrumental help to executive help; this is particularly true at low ability levels (Nelson-Le Gall, 1987). Although elementary school girls are generally believed to be better helpers than boys, this does not alter the

preference of students at this age level, who generally ask individuals of their own gender for help. This selection may simply be a function of friendship rather than of gender per se (Nelson-Le Gall & DeCooke, 1987; Nelson-Le Gall & Glor-Scheib, 1986).

Researchers who generally accept that female students ask for more help than do male students have also pursued the question of whether girls may be overly dependent on help or whether boys may be underutilizing help (Butler, 1998; Nadler, 1997). They have suggested that female students' preference for instrumental help over executive help is one sign that girls are making appropriate use of help and are not overly dependent on help-providers (Butler, 1998; Nelson-Le Gall & Glor-Scheib, 1985). Boys with performance goals have been singled out as underutilizing help; in some cases they may even cheat rather than ask for help (Butler, 1998). The appropriate utilization of help remains a fruitful avenue of inquiry for researchers.

Gender orientation may be more important than gender in establishing a connection with academic help-seeking (Nadler, 1997). Female students high in femininity seek more help than do female students who are androgynous (Nadler et al., 1984). Similarly, male students high in masculinity seek less help than do androgynous male students. This is particularly true for students with low self-perceptions of competence.

In summary, motivation researchers have not reached firm conclusions regarding gender differences in academic help-seeking. It may even be that gender orientation may play a more critical role than gender in predicting academic help-seeking (Nadler et al., 1984). A more fruitful avenue for research may well be investigating whether individuals of different gender orientations overutilize or underutilize available help.

Ethnicity

Few researchers have conducted either race-homogeneous or race-comparative studies of the help-seeking of students of color. What few insights are available about the academic help-seeking behaviors of these students have been provided by Nelson-Le Gall and her colleagues, who have investigated help-seeking in African American populations. Their findings suggest that teachers and African American students in Grade 1, kindergarten, and preschool do not view help-seeking and task persistence as conflicting behaviors (Nelson-Le Gall & Scott-Jones, 1985). Middle class upper elementary school African American students report that they consider both perceived competence and friendship in choosing a helper (Nelson-Le Gall & Glor-Scheib, 1986). When deciding whether to seek help, similar students from working and lower class families will rely on their beliefs about their performance rather than on their objectively assessed, or actual, performance. African American students with a strong intrinsic orientation also preferred hints to answers to a greater degree than did students with weak intrinsic orientations (Nelson-Le Gall & Jones, 1990).

Although ethnically diverse participants are often included in studies of academic motivation, researchers typically do not report ethnic differences (e.g., Zimmerman & Martinez-Pons, 1990) This has also been the case with studies of help-seeking. One exceptions is Ryan et al.'s (1997) investigation of 443 White, African American, and Hispanic Grade 5 students in which no race differences in students' avoidance of help-seeking or perceived threat associated with help-seeking were discovered.

Nelson-Le Gall and Jones (1991) characterize African Americans as group-oriented and speculate that help-seeking should therefore fit into the cultural norm.

They explain the drop in African American achievement at the third grade level as being partially due to the change in the social interaction style of the classroom from the second grade. They also believe that successful African American students have parents who support and encourage their style of seeking help.

In summary, the relationship between ethnicity and academic help-seeking is an underexplored research area. Although some researchers have included diverse samples, race differences are seldom reported. Further study comparing more diverse samples would be appropriate.

<center>Developmental Level</center>

As students advance through school and become better at regulating their learning, it is generally expected that they will engage in more adaptive help-seeking than do children in lower grade levels (Nelson-Le Gall, 1987; Nelson-Le Gall et al., 1989; Nelson-Le Gall & Jones, 1990). In part this can be attributed to maturation. However, because studies are typically conducted with students of a certain grade level rather than with students of a particular age, it is difficult to separate age and grade level when making contentions about the influence of development on motivation and achievement.

Furthermore, many researchers suggest that the transition in the United States from elementary school to junior high school and high school influences the motivational changes that students go through (Pintrich & Schunk, 1996). For these reasons, in this review I use the term "developmental level" to refer to the effects of growth and maturation reported by researchers who have investigated changes in help-seeking behaviors either across academic levels or as a function of age.

Self-regulation has been shown to increase with corresponding increases in both grade level and academic success (Newman, 1991; Puustinen, 1998; Zimmerman & Martinez-Pons, 1990). In particular, as students develop they become more adept at realizing when help is needed (Nelson-Le Gall et al., 1983; Puustinen, 1998). In other words, older children are better able than younger children to realize when they are in the zone of proximal development and can benefit from the help of an adult or more capable peer (c.f., Vygotsky, 1978). These older students have often made the transition from other-regulation to self-regulation.

Researchers generally believe that older students seek more help than do younger students, seek more "necessary" than "unnecessary" help when compared with younger students, and increasingly prefer "mastery oriented" to "dependency oriented" help as they age (Nelson-Le Gall, 1987; Nelson-Le Gall et al., 1989; Nelson-Le Gall & Jones, 1990; Newman, 1990, 1994). In comparison to younger students, older students request help more often when their work is incorrect than when it is already correct. Older students also prefer hints to answers more than do younger students (Nelson-Le Gall et al., 1990). This preference may be attributed to the desire of older children to master the material, but it may also be attributable to older children's internalization of classroom rules stating that acquiring the precise answer is cheating (Nelson-Le Gall & Jones, 1990). As compared to younger students, older students like to ask questions, believe that asking questions helps them learn, believe that their teacher is encouraging of question asking, and believe that the "smart kids" are the ones asking most of the questions in the classroom (Newman & Schwager, 1993). Older students also have a more refined repertoire of strategies for seeking help from others than do younger students (Nelson-Le

Gall, 1981). Finally, older students more than younger children understand the amount of indebtedness incurred by a help-seeking experience, which can vary according to the cost incurred by the help-provider (DeCooke, 1992, 1997).

Knowledge of attributes to look for in a potential helper is an important part of the help-seeking function. Although children in kindergarten do not recognize the importance of a variety of attributes in helpers, children in Grades 3 and 6 become increasingly aware of the attributes to search for in their helpers (Barnett, Darcie, Holland, & Kobasigawa, 1982). Older students are more aware of specific attributes that characterize a good helper and are more knowledgeable about the characteristics that distinguish helping situations from one another, such as the relationship between the helper and the receiver of help (Nelson-Le Gall & Gumerman, 1984). As children get older, their ability to find better helpers increases their capacity to be effective seekers of help.

There is some evidence that, under some conditions, younger students may seek more help than older students (Newman & Schwager, 1993). Nelson-Le Gall et al. (1990) suggest that younger students may seek more help than older students, although the help may not necessarily be adaptive. Self-assessments of performance are more aligned with outcomes for older students than for younger students, so younger students may not be as accurate in realizing when their answers are indeed correct, and younger students may seek help even when they believe that the answer they have supplied is correct. Older students are more concerned with social comparisons in their more competitive classrooms and therefore may not seek help unless their classmates are also in need of assistance whereas younger students are not sensitive to variations in classmates' need for help (Newman & Schwager, 1993). Furthermore, older students may seek less help than

younger students due to the concern that the teacher may think they are "dumb" for needing help. Although younger children are aware of both the threats and costs of help-seeking, only older children are inhibited from seeking help by the perceived costs such as embarrassment and threat to self-esteem (Karabenick & Sharma, 1994b; Newman, 1990). Good et al. (1987) also suggest that over time low-achievers ask fewer questions in the classroom. Female students ask fewer questions over time in the mathematics classroom, and male students ask fewer questions over time in the language arts classroom (Good & Slavings, 1988). Thus some older students become passive and seek less help than do younger students.

In some cases researchers find no developmental level effect on help-seeking (van der Meij, 1988). Students ask for the same amount of help when placed in task or ego-focus conditions regardless of their age (Butler & Neuman, 1995). Elementary school students at different grade levels ask for similar amounts of help in both mathematics and reading classes (Nelson-Le Gall & Glor-Scheib, 1985) and have similar concerns about asking questions in the mathematics classroom (van der Meij, 1988).

Although the teacher remains an important source of help, as they grow older students increasingly select peer helpers (Nelson-Le Gall & Glor-Scheib, 1985; Nelson-Le Gall & Gumerman, 1984). Older students may still ask more questions of the teacher than of their classmates and may actually prefer to ask the teacher, believing that they learn more from the teacher than from peers (Newman & Goldin, 1990; Newman & Schwager, 1993). However, as they age even students who prefer the teacher's help may increasingly rely on peers because the teacher may be perceived as too busy to help

(Nelson-Le Gall, 1981; Oberman, 2000). Furthermore, some students prefer the help of their peers, believing that they communicate at a similar intellectual level.

Observing peers receive help is often an attributional cue for students (Graham & Barker, 1990). Children as young as six years old perceive unsolicited help from the teacher as an indication of low ability. Older children, but not younger children, also perceive unsolicited peer help as an indication of low ability. Older children generally believe that students with lower ability exert greater effort to accommodate for their lack of ability. Younger children typically rate both ability and effort as high for students who succeed at a task and low for students who are unsuccessful.

Some limitations of the research on developmental level and help-seeking are noteworthy. With only a few exceptions, researchers examining developmental help-seeking in multiple grade levels have focused on students below Grade 8 (Good et al., 1987; Good & Slavings, 1988; Zimmerman & Martinez-Pons, 1990). Many of the studies are conducted in laboratory settings that ignore classroom situational factors (Graham & Barker, 1990; Nelson-Le Gall et al., 1989; Newman & Schwager, 1993). Those studies conducted in classroom settings fail to adequately distinguish among types of questions and types of help-seeking (Good et al., 1987; Good & Slavings, 1988). A student may ask a question for many reasons, including the purpose of sidetracking the teacher, just as a student may seek help either to learn or merely to complete the task at hand. Considering every question a help-seeking attempt does not adequately address the nuances involved in adaptive help-seeking.

Although there is no consensus among researchers as to who seeks the most help, most researchers believe that older children are better help-seekers than are younger

children (Nelson-Le Gall, 1987; Nelson-Le Gall et al., 1989; Nelson-Le Gall & Jones, 1990; Newman, 1990, 1994). Older children prefer instrumental help to executive help more than do younger children, and older children are better able to identify potential helpers than are younger children. Older children generally appreciate the complexity of the helping situation more than do younger children.

Summary

Help-seeking in school settings is an important part of the academic experience. Researchers have identified two forms of help-seeking, instrumental and executive, of which the former is adaptive and the latter is maladaptive. However, scales that measure academic help-seeking have been problematic, both conceptually and psychometrically. This suggests that more reliable and valid scales are required. When academic help-seeking has been studied in concert with motivation and other variables, it has been shown to be related to motivation, gender, ethnicity, and developmental level. These constructs play a role in the manner in which students seek academic help as they grow.

Before seeking help, students weigh the costs and benefits (Karabenick, 1990). The costs of not seeking help include disappointment, a poor performance, failure, lower self-esteem, and lowered perceptions of competence. Among the costs of seeking help are threat to a student's self-esteem, embarrassment, performance anxiety, the expectation of reciprocity, and the time and effort involved (DeCooke, 1992, 1997; Karabenick, 1990; Nadler & Fisher, 1986; Shapiro, 1983). If the benefits outweigh the costs, students seek help with their academic problems; otherwise, students will not seek help.

Over the course of an academic career, the vulnerability hypothesis appears to apply to both self-perceptions of competence and self-concept (Newman, 1990; Ryan &

Pintrich, 1997). Students with task goals and students who are intrinsically motivated are likely to seek adaptive help (Newman, 1990; Ryan et al., 1997). Students who attribute failure to lack of effort or other reasons under their control but have confidence in their abilities are also likely to seek help (Ames, 1983). Older children and those who use self-regulatory strategies are also likely to seek help when needed (Karabenick & Knapp, 1991; Nelson-Le Gall, 1987; Newman, 1990). It seems likely that a feminine gender orientation is correlated with help-seeking, although this needs to be corroborated by future researchers (Nadler et al., 1984). The connection between help-seeking and both ethnicity and value are underexplored research areas, and no firm conclusions are available (Good & Slavings, 1988; Nelson-Le Gall & Jones, 1991).

It is possible to describe a hypothetical student who would be an ideal seeker of adaptive help and a student who would be unlikely to seek adaptive help. Generally an older self-regulating student with an intrinsic orientation, task goals, feminine gender orientation, and help-relevant attributions placed in a condition of noncompetitive task-orientation will seek instrumental help when it is needed. On the other hand, a younger non-self-regulating student with an extrinsic orientation, performance goals, masculine gender orientation, and help-irrelevant attributions placed in a condition of competitive performance-orientation will not seek adaptive help (Ames, 1983; Karabenick & Knapp, 1991; Magnusson & Perry, 1992; Nadler et al., 1984; Nelson-Le Gall, 1987; Nelson-Le Gall & Jones, 1990; Newman, 1990, 1991; Ryan et al., 1997; Ryan & Pintrich, 1997).

CHAPTER III
METHODS AND PROCEDURES

The primary objective of this study was to determine the degree to which

constructs prominent in the area of academic motivation predict the executive help-

seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of

help-seeking of high school students enrolled in computer science Because instruments

with sound empirical properties were not available, scales were first created or adapted

for each help-seeking construct. In addition, I sought to discover whether average scores

in the help-seeking variables would differ by gender and/or by ethnicity. Finally, if gender

differences could be detected, I sought to determine whether these differences could be

accounted for by gender orientation beliefs. In this chapter I first restate the research

questions that guided the investigation. Second, I describe the nature of the study's

participants. Third, I explain the process and procedures involved in collecting the data.

Fourth, I identify the instruments used. Last, I discuss the statistical analyses conducted.

Research Questions

Using results of previous research on help-seeking as a starting point, I posed

three research questions. Through these questions, I investigated the relationship between

help-seeking and motivation, gender and ethnicity, and gender orientation. Help-seeking

scales with strong empirical qualities were required to answer these questions. Because

such scales were not available in the literature, especially as regards instrumental help-

seeking and executive help-seeking, a prerequisite to answering the research questions was to construct appropriate scales with which to measure these key constructs. The research questions are presented below in literary form.

1. To what degree do computer science grade self-efficacy, computer science self-concept, computer science anxiety, achievement goals in computer science, self-efficacy for self-regulation, value of computer science, and computer science achievement make an independent contribution to the prediction of executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking?

2. Do mean scores on executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking differ by gender and/or ethnicity?

3. Are gender differences in executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking a function of gender orientation beliefs?

Participants and Setting

Participants were 314 students, in grades 8–12, enrolled in elective computer science classes in private or public schools in the South. There were 250 boys and 64 girls in the sample. The socioeconomic status of the schools and of the areas that the schools serve varied considerably. White students (n = 142), African American students (n = 82), and Asian American students (n = 62) were represented. There were 78 private school students and 236 public school students. Of the 314 students, 4 were in Grade 8, 17 were in Grade 9, 26 were in Grade 10, 143 were in Grade 11, and 124 were in Grade 12. Instruments were group administered in individual computer science classes during one

period in November of the 2001/2002 academic year. Written permission to gather data

was provided by the county, school administration, and each student and parent (see

Appendix C). Procedures were consistent with those used by educational psychologists

(see, for example, Pajares et al., 1999; Pajares & Valiante, 1997, 1999).

<center>Variable Definition and Scales</center>

Instruments and variables used in this study to assess the motivation variables

have been used by researchers in numerous investigations of academic motivation (e.g.,

Middleton & Midgley, 1997; Pajares et al., 1999; Pajares & Valiante, 1999; Zimmerman

& Bandura, 1994; Zimmerman & Martinez-Pons, 1990). All scales ask students to

provide judgments along an 8-point Likert-type continuum. The instrument is provided in

Appendix A.

Instrumental Help-Seeking. Instrumental help-seeking is characterized by "those

instances in which the help requested is limited to only the amount and type that is

needed to allow the child to solve the problem or attain the goal in question for himself or

herself" (Nelson-Le Gall, 1981). Instrumental help-seeking is also referred to as adaptive

help-seeking by some researchers. Instrumental help-seeking is assessed with two

different scales. The first scale that I use is that used by Arbreton (1993); this scale has

five items, and a reported alpha coefficient of .69 (sample item:"Before I ask for help

with my computer science work, I think about what kinds of questions to ask"). All of the

instrumental help-seeking scales that I located were problematic, both psychometrically in

terms of low alpha coefficients and conceptually in terms of a misalignment with the

definition of instrumental help-seeking. For example, Karabenick (2001) reported an

alpha coefficient of .62, and Ryan and Pintrich (1997) reported an alpha coefficient of only .77 for their adaptive help-seeking items.

Therefore I generated my own scale with items adapted from Abreton (1993) and Ryan and Pintrich (1997) as well as items that I developed based on Nelson-Le Gall's definition above. This 10-item scale is purposefully balanced between help asked from the teacher and help asked from fellow students. Efforts were made to ensure that the distinction between instrumental and executive help- seeking was not confounded with the decision to seek help (as in other scales) by starting items with some variation of "when I ask for help in this class." I believe that this is an improvement upon "if I need help to do a problem" (Arbreton, 1993; Karabenick & Knapp, 1991; Newman, 1990; Ryan & Pintrich, 1997) because the latter does not necessarily imply that help will be sought. A sample item from the current scale is "When I ask my teacher for help in this class, I only want as much help as necessary to complete the work myself." I compare Arbreton's scale to the scale that I constructed in terms of reliability and use the more reliable scale to assess instrumental help-seeking.

Executive Help-Seeking. Executive help-seeking is evident in help-seeking situations in which "the child's intention is to have someone else solve a problem or attain a goal on his or her behalf. Such bids for assistance may include those in which the help sought is not needed for the child to solve the problem" (Nelson-Le Gall, 1981). Executive help-seeking is also assessed with two different scales. The first scale that I use is that used by Arbreton (1993); this scale has three items, and a reported alpha coefficient of .53 (sample item:"I often ask the teacher for help in computer science before I try the work on my own"). All of the executive help-seeking scales that I located

were problematic, both psychometrically in terms of low alpha coefficients and conceptually in terms of a misalignment with the definition of executive help-seeking. For example, some researchers have had difficulty separating executive help-seeking items in a factor analysis or have had to drop the scale because of a low alpha (Ryan & Pintrich, 1997).

Ryan (A. Ryan, personal communication, May 11, 2001) has had some success recently with a 4-item scale of dependent/expedient help, yet she still achieved an alpha of only .75. Karabenick (2001) achieved an alpha of .78. Therefore I generated my own scale with items adapted from Abreton (1993) and Ryan and Pintrich (1997) as well as items that I developed based on Nelson-Le Gall's definition above. This 10-item scale is purposefully balanced between help asked from the teacher and help asked from fellow students. Efforts were made to ensure that the distinction between instrumental and executive help- seeking was not confounded with the decision to seek help (as in other scales) by starting items with some variation of "when I ask for help in this class." I believe that this is an improvement upon "if I need help to do a problem" (Arbreton, 1993; Karabenick & Knapp, 1991; Newman, 1990; Ryan & Pintrich, 1997) because the latter does not necessarily imply that help will be sought. A sample item from the current scale is "When I ask my teacher for help in this class, I want the teacher to do the work for me rather than help me be able to complete the work myself." I compare Arbreton's scale to the scale that I constructed in terms of reliability and use the more reliable scale to assess executive help-seeking.

Avoidance of Help-Seeking. Avoidance of help-seeking "refers to instances when a student needs help but does not seek it" (Ryan & Pintrich, 1997, p. 329). Avoidance of

help-seeking is assessed with items adapted from Abreton (1993), Karabenick (2001), Newman (1990), Newman and Schwager (1993), and Ryan and Pintrich (1997). The 9-item scale used in the present study includes such items as "If I need help to do a problem in this class, I prefer to skip it rather than to ask for help." Ryan and Pintrich (1997) reported an alpha coefficient of .76 for their avoidance of help-seeking items, while Arbreton (1993) reported an alpha coefficient of .60. Ryan and others have consistently reported their scale producing alpha coefficients above .75 with students in Grades 5 through 8 (Ryan et al., 1997; Ryan & Pintrich, 1997). Karabenick (2001) reported an alpha of .77, Middleton and Midgley (1997) reported an alpha coefficient of .79, and Ryan et al. (1998) reported an alpha of .80.

Perceived Benefits of Help-Seeking. The perceived benefits of help-seeking are the positive ramifications of seeking help on a task, from an individual perspective. Previous scales measuring the perceived benefits of help-seeking have seemed problematic, both psychometrically in terms of low alpha coefficients and conceptually in terms of excluding some important benefits of help-seeking. For example, Ryan and Pintrich (1997) reported an alpha coefficient of .79 for their perceived benefits of help-seeking items, and Newman (1990) reported an alpha coefficient of only .65 for items tapping positive attitudes toward help- seeking. Therefore perceived benefits of help-seeking is assessed with items adapted from Newman (1990), Newman and Goldin (1990), Newman and Schwager (1993), Ryan and Pintrich (1997), and items that I developed to address excluded benefits of help-seeking. The 7-item scale used in the present study includes such items as "I like to ask for help in this class because it helps me understand the topic more completely."

Computer Science Grade Self-Efficacy. Self-efficacy is defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Consistent with guidelines provided by Bandura (2001), computer science grade self-efficacy is operationalized as students' judgments of their confidence that they can achieve a certain grade in their computer science course. A sample item is "How confident are you that you will get an A in this class?" Responses range from 1 (not confident at all) to 8 (completely confident). When this type of scale has been used in various academic areas, alpha coefficients ranging from .70 to .89 have been reported (Pajares et al., 2000; Valiante & Pajares, 1999; Zimmerman, Bandura, & Martinez-Pons, 1992). For this study the alpha coefficient was .92.

Gender Orientation. Gender orientation is an individual's stereotypic beliefs about gender. Students' beliefs about gender orientation were assessed by asking students to report how strongly they identified with characteristics associated with stereotypical males or females in the United States (Harter et al., 1997). For some time researchers assumed that gender orientation was a unidimensional construct that could be sufficiently measured using a single score such that a low feminine score indicated high masculinity (see Constantinople, 1973). Researchers today agree that gender orientation is not unidimensional. Rather, they contend that masculinity and femininity are orthogonal variables that represent two distinct dimensions of individuals' self-conceptions. An individual can possess both high masculinity and high femininity (termed androgyny) or, conversely, low masculinity and low femininity (termed undifferentiated) (Harter et al., 1997).

For the present study, gender orientation is assessed with items used by Pajares and Valiante (2001). These items were first used in various studies by Harter and her colleagues (see Harter et al., 1997) and adapted primarily from the short form of the Children's Sex Role Inventory (CSRI) (Boldizar, 1991) (sample masculinity item: "I like building and fixing things"; sample femininity item: "I am a warm person and express these feelings to those I feel close to."). Pajares and Valiante (2001) obtained Cronbach's alpha reliability of .76 for the masculinity scale and .88 for the femininity scale. For this study the alpha reliability was .80 for the masculinity scale and .87 for the femininity scale.

Computer science self-concept. Researchers typically define self-concept in academic contexts as students' judgments of their self-worth in an academic area (Pajares, 1996a). While self-efficacy is a judgment of one's competence to plan and perform the behaviors required to succeed at a task, self-concept—although made up of the same type of self-evaluations—also includes judgments of self-worth that accompany participation in the particular activity. Self-concept also measures less task-specific beliefs of ability (Marsh, 1990, 1992; Pajares, 1997). Also, a student may be highly efficacious in the area of computer science, but without a feeling of self-worth because that student may take no pride in accomplishments in this field. Alternatively a student may have low efficacy to succeed in computer science but hold positive feelings of self-worth about the area of computer science because that student attributes her failure to something aside from her skill level (e.g., family crisis). Self-concept and self-efficacy are also assessed differently. While self-efficacy items typically use the verb "can" as in "How confident are you that you can get an A," self-concept items typically use the verb

"are" or "feel" as in "Computer science makes me feel inadequate." Because much of the literature on academic help-seeking has looked at variables such as self-esteem, a variable closely related to general self-concept, self-concept is an important variable to assess in the present study.

Computer science self-concept is operationalized in the present study as students' perceptions about their computer science ability and their feelings of self-worth associated with this ability. In the present study computer science self-concept is assessed with nine items from the Self-Description Questionnaire III (SDQIII) adapted for computer science (see Marsh, 1992). Directions ask students to "use the following scale to respond to the following statements" (sample item: "I am quite good at computer science"). The 8-point Likert scale ranges from 1 (completely false) to 8 (completely true). When items similar to these have been used in scales assessing mathematics, science, and writing, alpha coefficients have ranged from .84 to .95 (Marsh, 1992; Pajares & Kranzler, 1995a; Pajares & Miller, 1994, 1995; Pajares & Urdan, 1996). For the current study the alpha coefficient was .88.

Computer Science Anxiety. Computer science anxiety includes the feelings of tension and anxiety that interfere with the construction of computer science knowledge, the development of computer science skills and abilities, and the use of computer science knowledge, skills, and abilities inside and outside of academic settings (Richardson & Suinn, 1972). The 9-item computer science anxiety scale used in the present study asks students to consider statements about comfort or anxiety with computer science (sample item: "Computer science makes me feel uncomfortable and nervous"). The computer science anxiety scale is adapted from Betz's (1978) Mathematics Anxiety Scale in line

with guidelines provided by Pajares and Urdan's (1996) factor analysis. The adapted

MAS used in the present study consists of 8 of the original 10 items and one suggested by

Pajares and Urdan, all adapted for computer science. Alpha coefficients ranging from .86

to .92 have typically been reported on the original MAS (e.g., Hackett & Betz, 1989;

Pajares & Kranzler, 1995b; Pajares & Urdan, 1996). The adapted MAS for mathematics

has produced alpha coefficients ranging from .87 to .91 (Pajares & Graham, 1999). This

measure is scored such that a high score is indicative of high anxiety. For this study the

alpha coefficient was .93.

Achievement Goal Orientation. A student's achievement goal orientation is that

individual's reason for doing academic work (Pintrich & Schunk, 1996). Task-goals (also

known as learning goals or mastery goals) involve the desire of students to understand

and master a task for its own sake (Elliott & Harackiewicz, 1996). Performance-approach

goals involve the desire of students to be deemed competent. Performance-avoid goals

involve the desire of students to avoid being deemed incompetent. These goal

orientations affect the way that a student behaves in an achievement setting (Pintrich &

Schunk, 1996). A task goal orientation has typically been found to be beneficial for

student performance and motivation, whereas a performance-avoid orientation is

detrimental (see Pajares et al., 2000; Urdan & Maehr, 1995). The role of

performance-approach goal orientations is still to be determined.

The 16-item scale used in the present study was derived from the Patterns of

Adaptive Learning Survey (PALS) (Middleton & Midgley, 1997) and adapted to reflect

goals toward success in school. For the scale used in the present study, there were five

task goal items (sample item: "I like computer science assignments I can learn from, even

if I make a lot of mistakes"), five performance-approach items (sample item: "I'd like to show my computer science teacher that I'm smarter than the other students in my computer science class"), and six performance-avoid goal items (sample item: "One reason I might not participate in computer science class is to avoid looking stupid"). When the scale has been used to measure academic subjects such as writing and science, alpha coefficients have ranged from .77 to .89 (Middleton & Midgley, 1997; Pajares et al., 2000; Pajares & Valiante, 2001). For this study the alpha coefficient was .86 for task goals, .81 for performance-approach goals, and .82 for performance-avoid goals.

Self-Efficacy for Self-Regulated Learning. In schooling, self-regulation is the process of regulating one's behaviors, thoughts, and emotions when working toward academic tasks (Pintrich & Schunk, 1996; Stipek, 1998). Because students want to successfully complete these tasks, they will use self-regulated learning strategies to assist them (Pintrich & Schunk, 1996). These strategies include such activities as rehearsing, clarifying, setting goals, making connections, and making predictions (Pintrich & Schunk, 1996; Stipek, 1998). Self-efficacy for self-regulated learning measures students' judgments of their capacity to use self-regulated learning strategies. The 7-item scale used in the present study is a subscale adapted from Bandura's Children's Multidimensional Self-Efficacy Scales (see Zimmerman et al., 1992) (Sample item: "How well can you motivate yourself to do schoolwork?"). Responses were made on a Likert scale from 1 (not well at all) to 8 (very well). Zimmerman and Martinez-Pons (1988) conducted a validation study which revealed that a single factor underlay the items. When the scale has been used in studies of writing and science, researchers have reported Cronbach's alpha coefficients ranging from .69 to .87 (Pajares, 1996a; Pajares et al., 1999; Pajares et

al., 2000; Pajares & Valiante, 1997, 1999, 2001; Zimmerman et al., 1992). For this study the alpha coefficient was .86.

Value of Computer Science. Value of computer science is defined as student beliefs rating perceived importance, interest, and enjoyment of computer science. The scale used in the present study consists of 9 items and is measured on an 8-point Likert scale. The two importance items are adapted from the Student Attitude Questionnaire (SAQ) (Eccles, 1983) and were used by Meece, Wigfield, and Eccles (1990). Students rate how important it is to be good at and get good grades in computer science. The three interest questions are intended to find out from students whether or not they find computer science as a subject, as well as solving computer science problems, interesting (see Seegers & Boekaerts, 1996). Enjoyment of computer science is assessed using four items (sample item: "I enjoy doing computer science work."). Researchers have reported alpha coefficients ranging from .69 to .92 when value has been assessed relative to a specific subject area or to school in general (Pajares, 2001; Pajares and Graham, 1999; Pajares & Valiante, 1997, 1999; Valiante & Pajares, 1999). For this study the alpha coefficient was .92.

Computer Science Achievement. Teacher ratings of students' computer science achievement is acknowledged as a reliable assessment of students' computer science achievement (Hoge & Butcher, 1984). Consequently, the students' computer science teachers are asked to rate their students' computer science achievement on a 0–4 scale, much like the scale used by teachers to assess letter grades. This assessment is made late in the semester, after teachers have become well familiar with students' computer science skills and knowledge.

Analyses

To determine the degree to which various motivational variables make an independent contribution to the prediction of academic help-seeking, help-avoidance, and perceived benefits of help-seeking, simultaneous multiple regression was conducted (Question 1). Separate analyses were conducted for boys and for girls, as well as for African American, Asian American, and White students. Independent variables were computer science grade self-efficacy, computer science self-concept, computer science anxiety, achievement goals in computer science, self-efficacy for self-regulation, value of computer science, and computer science achievement. The dependent variables were instrumental help-seeking, executive help-seeking, avoidance of help-seeking, and perceived benefits of help-seeking. Beta values were supplemented with regression structure coefficients, which are not suppressed or inflated by collinearity between independent variables (see Thompson & Borello, 1985).

Multivariate analysis of variance (MANOVA) were conducted to determine whether mean scores on instrumental help-seeking, executive help-seeking, avoidance of help-seeking, and perceived benefits of help-seeking differed by gender or by ethnicity (Question 2). Consistent with methods previously used by researchers (e.g., Middleton & Midgley, 1997; Pajares et al., 2000), hierarchical multiple regression would have been conducted to determine the degree to which gender differences in students' academic help-seeking were a function of their gender orientation beliefs (Question 3). Because gender differences were not detected, these analyses were not conducted. All analyses were conducted using the SAS system (SAS Institute, Inc., 1999).

CHAPTER IV
RESULTS

In this chapter, I first provide results of validation analyses of the help-seeking

scales created for this study, followed by descriptive and correlational results from the

variables under investigation. I then present and discuss results of the data analyses

pertinent to each research question. Finally, I present results of additional analyses

pertinent to the data gathered. Appropriate tables are included.

Validation Results of Help-Seeking Scales

A prerequisite to answering the research questions of this investigation was to

create help-seeking scales with sound empirical properties. As I observed in Chapter 2,

the help-seeking scales currently in use were problematic, both psychometrically in terms

of weak reliability indexes and conceptually in terms of misalignment with the generally

accepted definitions of the constructs. This was particularly the case with the instrumental

and executive help-seeking scales. For example, Arbreton (1993) reported an alpha

coefficient of .69 for her instrumental help-seeking scale and .53 for executive help-

seeking. Ryan and Pintrich (1997) reported an alpha coefficient of .77 for their adaptive

help-seeking scale, and Ryan (A. Ryan, personal communication, May 11, 2001) obtained

an alpha coefficient of .75 for dependent-expedient help. Karabenick (2001) reported an

alpha coefficient of .62 for his instrumental help-seeking scale and .78 for his executive

help-seeking scale. Similarly, researchers have reported alpha coefficients ranging from

.60 to .80 for avoidance of help-seeking scales and from .65 to .79 for perceived benefits of help-seeking scales (e.g., Abreton, 1993; Ryan et al., 1997; Ryan et al., 1998; Ryan & Pintrich, 1997). For the present study, new scales of instrumental and executive help-seeking were created, and items from several avoidance of help-seeking scales and perceived benefits of help-seeking scales were used and sometimes altered to create adapted versions of each of these scales.

I conducted three exploratory factor analyses, one each for the (a) instrumental and executive help-seeking items, (b) help avoidance items, and (c) benefits of help-seeking items. I used the maximum likelihood method of extraction (Jöreskog & Lawley, 1968) because this is the method believed to produce the best parameter estimates (Pedhazur, 1982). Criteria to determine the number of common factors to retain and analyze included Cattell's (1966) scree test; eigenvalues greater than 1.0; the percentage of common variance explained by each factor using the weighted, reduced correlation matrix; and the interpretability of the rotated factors. Because factors that emerged from the analyses might be intercorrelated, I chose the oblimin method of oblique rotation. All analyses were conducted using the SAS system's FACTOR procedure (SAS Institute, Inc., 1999).

The first factor analysis conducted to examine the factor structure of the 20 instrumental and executive help-seeking items revealed that the two scales were composed of two factors. Table 1 shows the rotated factor pattern coefficients, factor structure coefficients from the rotated pattern matrix, and percentage of variance explained for the two-factor solutions for each of the two scales. The factor structure coefficients represent the product-moment correlations between a particular item and its

common factor. Rotated factor pattern coefficients from the pattern matrix demonstrate the relationship between an item and a factor when holding all other items constant. They are, in essence, standardized regression coefficients similar to those obtained in regression analyses, and they reveal the unique contribution that each factor makes to the variance of the item. Rotated factor pattern coefficients of .35 or higher were considered strong enough to demonstrate that the item indicated the common factor. Nine of the first 10 items comprised Factor 2, and the second 10 items comprised Factor 1. Factor 1 tapped executive help-seeking whereas Factor 2 tapped instrumental help-seeking. Item #2 ("When I am having trouble and ask the computer science teacher for help, I like to be given examples of similar problems we have done.") loaded weakly on Factor 2. Factor structure coefficients were similar for each scale, as was the proportion of variance accounted for by each factor. Interfactor correlation was -.67.

Cronbach alpha coefficients were strong for each scale, and it bears noting that they are considerably stronger than those obtained by previous researchers assessing these two variables. The coefficient for instrumental help-seeking was initially .87, with 9 of the 10 items showing item-total correlations ranging from .51 to .70. As foreshadowed by the factor analysis, Item #2 had a weak item-total correlation of .22. Because of this and of the factor analytic results, this item was removed from the final scale. The final, 9-item instrumental help-seeking scale showed an alpha coefficient of .89. The alpha coefficient for executive help-seeking was .92, with all items showing item-total correlations ranging from .65 to .81. As explained earlier, when creating scales with which to assess a variable, a researcher always runs the risk that the newly constructed scales will reveal weak psychometric properties. For this reason, in addition to the new scales assessing

Table 1. Rotated Factor Pattern Coefficients and Factor Structure Coefficients for Instrumental Help-Seeking, Executive Help-Seeking, Avoidance of Help-Seeking, and Perceived Benefits of Help-Seeking

Item	Executive HS Factor 1		Instrumental HS Factor 2		Item	Avoidance of HS Factor 1	Item	Perceived Benefits of HS Factor 1		Factor 2	
INST1	-.09	(-.53)	.65	(.71)	HAV1	.49	HBEN1	.58	(.72)	.20	(.59)
INST2	.09	(-.12)	.30	(.24)	HAV2	.45	HBEN2	.63	(.64)	.01	(.44)
INST3	.02	(-.42)	.64	(.63)	HAV3	.76	HBEN3	.77	(.87)	.15	(.67)
INST4	-.22	(-.47)	.37	(.52)	HAV4	.66	HBEN4	.01	(.61)	.89	(.90)
INST5	-.20	(-.57)	.55	(.68)	HAV5	.63	HBEN5	.07	(.64)	.83	(.88)
INST6	-.06	(-.51)	.67	(.71)	HAV6	.75	HBEN6	.84	(.90)	.08	(.65)
INST7	-.27	(-.57)	.44	(.62)	HAV7	.70	HBEN7	.21	(.68)	.68	(.83)
INST8	-.35	(-.64)	.43	(.67)	HAV8	.74					
INST9	-.02	(-.54)	.77	(.78)	HAV9	.54					
INST10	-.18	(-.58)	.59	(.71)							
EXEC1	.71	(.70)	.01	(-.47)							
EXEC2	.68	(.75)	-.11	(-.57)							
EXEC3	.68	(.73)	-.07	(-.53)							
EXEC4	.70	(.75)	-.08	(-.55)							
EXEC5	.74	(.80)	-.09	(-.59)							
EXEC6	.64	(.67)	-.05	(-.48)							
EXEC7	.73	(.71)	.02	(-.47)							
EXEC8	.76	(.74)	.03	(-.48)							
EXEC9	.82	(.85)	-.05	(-.60)							
EXEC1	.70	(.71)	-.01	(-.48)							

Proportion of variance:
.88 .10 | 1.00 | .99 .10

Note: Factor structure coefficients are presented in parentheses. See Appendix B to match the item number with the items from the scales.

instrumental and executive help-seeking, the instrument included scales previously used

in prominent help-seeking research (Abreton, 1993). As they had been in previous

studies, Cronbach alpha coefficients for these scales were weak (.73 for instrumental

help-seeking; .68 for executive help-seeking). As a consequence of these results, the

newly constructed scales were used in this study to assess instrumental and executive

help-seeking.

The avoidance of help-seeking scale was composed of 9 items adapted from items

on several scales previously used by help-seeking researchers (Arbreton, 1993;

Karabenick, 2001; Newman, 1990; Newman & Schwager, 1993; Ryan & Pintrich, 1997).

As with instrumental and executive help-seeking scales, reliability indexes reported for

these scales were typically weak to modest, ranging from .60 to .80. Moreover factor

analytic results have never been presented. Results of the factor analysis conducted to

examine the factor structure of the 9 avoidance of help-seeking items revealed that the

scale was composed of a single factor (see Table 1). Rotated factor pattern coefficients

ranged from .45 to .76. The alpha coefficient for avoidance of help-seeking was .86, with

all items showing item-total correlations ranging from .43 to .70.

Finally, the perceived benefits of help-seeking scale consisted of 7 items adapted

from several scales previously used by help-seeking researchers (Newman, 1990;

Newman & Goldin, 1990; Newman & Schwager, 1993; Ryan & Pintrich, 1997), who

reported reliability indexes ranging from .65 to .79. None reported factor analyses.

Results of the factor analysis conducted to examine the factor structure of the 7-item

benefits of help-seeking scale used in the present study revealed that 4 of the items

comprised Factor 1 and 3 items comprised Factor 2. A quick look at the items revealed

that Factor 1 tapped benefits of help-seeking related to interest and enjoyment (e.g., "I

enjoy this class more when I ask questions."; "Asking questions makes this class more

interesting for me."), whereas Factor 2 tapped benefits related to improving learning and

understanding (e.g., "I think asking questions in this class helps me learn."; "I like to ask

for help in this class because it helps me understand computer science better."). Factor

structure coefficients were similar for each scale, as was the proportion of variance

accounted for by each factor. Interfactor correlation was .68. The alpha coefficient for

benefits of help-seeking was .91, with all items showing item-total correlations ranging

from .57 to .80.

In summary, results of the factor analyses and reliability estimates revealed that

each of the four help-seeking scales created for this study had strong psychometric

properties. Moreover, each proved more reliable than did measures previously used in

studies of academic help-seeking.

Descriptive Statistics

Tables 2, 3, 4, and 5 present means, standard deviations, and Pearson-Product

moment correlations for all variables in the study for the full sample, by gender, and by

ethnicity (White students, African American students, and Asian American students).

Results for African American students are represented on both Tables 3 and 4 to serve as

points of comparison for White students and Asian American students respectively.

Several correlations bear noting. Instrumental help-seeking and executive help-seeking

were negatively correlated both for boys ($r = -.72$) and for girls ($r = -.77$). As expected,

avoidance of help-seeking was negatively correlated with instrumental help-seeking for

boys ($r = -.25$) and for girls ($r = -.41$) and positively correlated with executive help-

seeking for boys ($r = .33$) and for girls ($r = .43$). Interestingly, perceived benefits of help-seeking correlated with instrumental help-seeking ($r = .39$) and executive help-seeking ($r = -.25$) only for boys.

What is most readily evident by looking at the correlational matrix is that instrumental help-seeking was positively correlated to the motivational variables, whereas executive help-seeking was negatively correlated with these variables. For example, for girls instrumental help-seeking correlated with computer science self-concept, computer science anxiety, task goals, self-efficacy for self-regulation, and value of computer science. Executive help-seeking was negatively correlated with these variables for girls. For boys, instrumental help-seeking was significantly correlated with each motivation variable, and executive help-seeking was significantly related to each variable with the exception of performance-approach goal orientation.

Performance-approach goal orientation was positively correlated with instrumental help-seeking and perceived benefits of help-seeking only for boys. Performance-avoid goal orientation was positively correlated with avoidance of help-seeking for boys and for girls, but it was negatively correlated with instrumental help-seeking and positively correlated with executive help-seeking only for boys. Computer science self-efficacy was correlated with avoidance of help-seeking and perceived benefits of help-seeking only for girls.

As regards the correlations by ethnicity, only task goals correlated with each help-seeking variable for White students, African American students, and Asian American students. With few exceptions, perceived value of computer science and self-efficacy for self-regulation were also powerful correlates of help-seeking. For White

Table 2. Means, Standard Deviations, and Correlations for Variables in the Study

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Instrum	6.08	1.35	–															
2. Executive	2.17	1.19	-.73***	–														
3. Avoidance	2.25	1.15	-.28***	.35***	–													
4. Benefits	5.25	1.66	.34***	-.22**	-.44***	–												
5. Self-effic	6.82	1.53	.16*	-.15*	-.10	.18*	–											
6. Self-conc	5.90	1.36	.34***	-.36***	-.16*	.14*	.60***	–										
7. Anxiety	2.97	1.69	-.24***	.30***	.13*	-.03	-.60***	-.77***	–									
8. Task goals	6.09	1.42	.59***	-.49***	-.24***	.41***	.42***	.60***	-.45***	–								
9. Perf-approa	5.24	1.68	.11	-.01	-.04	.11	.19**	.17*	-.04	.22***	–							
10. Perf-avoid	3.02	1.59	-.18*	.23***	.18*	-.01	-.11*	-.22***	.34***	-.14*	.36***	–						
11. Self-reg	5.70	1.41	.37***	-.38***	-.25***	.31***	.59***	.71***	-.62***	.68***	.15*	-.19**	–					
12. Value	6.01	1.54	.46***	-.40***	-.19**	.25***	.47***	.77***	-.57***	.75***	.16*	-.17*	.68***	–				
13. Gender	0.80	0.40	-.05	.02	.08	-.12*	.16*	.23***	-.27***	.11	.09	-.05	.15*	.22**	–			
14. Masculin	6.38	1.11	.18*	-.12*	-.16*	.17*	.15*	.24***	-.19**	.28***	.32***	.01	.23***	.26***	.38***	–		
15. Feminin	5.95	1.12	.15*	-.06	-.14*	.25***	-.01	-.08	.14*	.13*	-.02	-.01	.05	-.00	-.46***	.01	–	
16. Achievem	3.05	1.02	.15*	-.14*	-.08	.05	.61***	.47***	-.45***	.34***	.15*	-.14*	.44***	.37***	.09	.04	-.05	–

Note: With the exception of Achievement, all variables were assessed on a Likert-type scale with a response format of 1 (low) to 8 (high). Achievement was assessed with a scale that ranged from 0 (low) to 4 (high). *** $p < .0001$, ** $p < .001$, * $p < .05$, $N = 314$

Table 3. Means, Standard Deviations, and Correlations for Variables in the Study by Gender

	Girls M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Boys M	SD
1. Instrum	6.21	1.29	–	-.72***	-.25***	.39***	.18*	.35***	-.25***	.62***	.14*	-.20*	.39***	.48***	.23**	.18*	.18*	6.04	1.36
2. Executive	2.12	1.22	-.77***	–	.33***	-.25***	-.17*	-.41***	.33***	-.54***	-.03	.27***	-.42***	-.44***	-.14*	-.06	-.18*	2.18	1.18
3. Avoidance	2.07	1.19	-.41**	.43**	–	-.49***	-.07	-.12	.12	-.24**	-.05	.14*	-.23**	-.15*	-.19*	-.10	-.06	2.79	1.14
4. Benefits	5.64	1.75	.13	-.11	-.28*	–	.12	.11	-.01	.40***	.19*	.01	.26***	.26***	.32***	.24**	.06	5.15	1.62
5. Self-effic	6.33	1.78	.14	-.13	-.26*	.44**	–	.56***	-.55***	.42***	.19*	-.11	.55***	.43***	.15*	.11	.62***	6.95	1.43
6. Self-conc	5.27	1.29	.38*	-.25*	-.41**	.42**	.70***	–	-.77***	.61***	.18*	-.21**	.69***	.76***	.19*	.04	.46***	6.06	1.33
7. Anxiety	3.88	1.85	-.33*	.31*	.26*	-.26*	-.68***	-.69***	–	-.46***	-.02	.37***	-.58***	-.56***	-.13*	.00	-.45***	2.74	1.57
8. Task goals	5.78	1.43	.48***	-.34*	-.32*	.54***	.38*	.56***	-.40**	–	.26***	-.12	.68***	.76***	.28***	.25***	.35***	6.17	1.41
9. Perf-appro	4.95	1.78	.01	.02	-.03	-.13	.15	.08	.01	.03	–	.36***	.18*	.16*	.28***	.06	.15*	5.32	1.65
10. Perf-avoid	3.19	1.69	-.09	.08	.32*	-.10	-.11	-.21	.26*	-.18	.38*	–	-.16*	-.19*	-.02	-.01	-.14*	2.98	1.57
11. Self-reg	5.27	1.56	.37*	-.29*	-.35*	.56***	.65***	.75***	-.68***	.67***	-.00	-.28*	–	.68***	.22**	.15*	.45***	5.81	1.35
12. Value	5.35	1.58	.51***	-.33*	-.41**	.36*	.50***	.77***	-.49***	.72***	.10	-.09	.61***	–	.19*	.13*	.35***	6.18	1.49
13. Masculin	5.56	1.33	.21	-.12	-.25*	.02	-.02	.12	-.05	.19	.39*	.17	.11	.24	–	.28***	.01	6.59	0.93
14. Femininity	6.98	0.74	-.03	-.07	-.26*	.16	-.07	.01	.06	-.02	-.18	-.16	.05	.02	.09	–	-.00	5.69	1.05
15. Achievem	2.88	1.03	.08	-.01	-.21	.08	.57***	.48***	-.43**	.27*	.15	-.13	.35*	.39*	.00	-.07	–	3.09	1.02

Note: Correlations below the diagonal of the matrix are for girls (n=64); correlations above the diagonal of the matrix are for boys (n = 250). With the exception of Achievement, all variables were assessed on a Likert-type scale with a response format of 1 (low) to 8 (high). Achievement was assessed with a scale that ranged from 0 (low) to 4 (high).
*** p < .0001, ** p < .001, * p < .05

Table 4. Means, Standard Deviations, and Correlations for Variables in the Study for Whites and African Americans

	Whites M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	African Americans M	SD
1. Instrum	6.06	1.32	—	-.74***	-.40**	.44***	.19	.35*	-.31*	.61***	.24*	-.25*	.41**	.50***	.11	.15	.22	-.07	6.07	1.44
2. Executive	2.21	1.14	-.73***	—	.29*	-.27*	-.28*	-.44***	.35*	-.59***	-.18	.10	-.51***	-.50***	-.06	-.18	-.21	.06	2.15	1.23
3. Avoidance	2.35	1.20	-.20*	.32***	—	-.49***	-.21	-.21	.21	-.38**	-.19	.26*	-.30*	-.31*	-.01	-.03	-.19	.02	1.97	0.93
4. Benefits	5.12	1.62	.32**	-.21*	-.58***	—	.36**	.31*	-.19	.54***	.29*	-.07	.42***	.37**	.06	.25*	.22*	-.14	5.54	1.78
5. Self-effic	7.08	1.25	.17*	-.18*	-.21*	.16	—	.66***	-.62***	.56***	.11	-.18	.73***	.59***	.02	.14	.70***	.03	6.38	1.90
6. Self-conc	6.19	1.27	.32***	-.35***	-.05	.03	.65***	—	-.76***	.63***	.07	-.31*	.77***	.80***	.10	.02	.44***	.13	5.59	1.52
7. Anxiety	2.61	1.58	-.23*	.29**	.02	.03	-.60***	-.82***	—	-.48***	.01	.44***	-.67***	-.63***	-.14	.15	-.50***	-.29*	3.34	1.86
8. Task goals	6.23	1.19	.61***	-.55***	-.18*	.23*	.41***	.63***	-.56***	—	.24*	-.14	.73***	.77***	.27*	.20	.37**	.09	5.91	1.73
9. Perf-appro	5.38	1.70	.02	.08	-.02	.07	.28**	.22*	-.06	.17*	—	.19	.11	.15	.35*	-.05	.02	-.00	4.73	1.60
10. Perf-avoid	2.95	1.53	-.22*	.29**	.16	-.03	-.28**	-.26*	.37***	-.28**	.31**	—	-.27*	-.18	.11	.07	-.27*	-.12	2.75	1.55
11. Self-reg	5.87	1.22	.34***	-.40***	-.22*	.21*	.49***	.68***	-.67***	.63***	.19*	-.28**	—	.71***	.11	.12	.54***	.10	5.55	1.72
12. Value	6.33	1.26	.44***	-.40***	-.08	.15	.44***	.76***	-.59***	.77***	.15	-.28**	.64***	—	.21	.00	.42***	.21	5.68	1.85
13. Masculin	6.43	1.05	.15	-.09	-.17*	.27*	.25*	.30**	-.16	.24*	.33***	-.06	.29**	.25*	—	.01	-.08	.50***	6.45	1.10
14. Femininity	5.60	1.11	.12	.09	-.08	.21*	.04	-.05	.05	.05	-.01	-.03	-.03	.04	.02	—	.05	-.46***	6.34	1.16
15. Achievem	3.39	0.79	.06	-.09	-.08	.03	.64***	.45***	-.41***	.29**	.20*	-.14	.32***	.27*	.07	.05	—	-.05	2.57	1.19
16. Gender	0.91	0.29	.02	-.11	.03	-.04	.11	.26*	-.26*	.17*	.06	-.11	.27*	.18*	.23*	-.38***	-.03	—	0.71	0.46

Note: Correlations below the diagonal of the matrix are for White students (n=142); correlations above the diagonal of the matrix are for African American students (n=82). With the exception of Achievement, all variables were assessed on a Likert-type scale with a response format of 1 (low) to 8 (high). Achievement was assessed with a scale that ranged from 0 (low) to 4 (high). *** p < .0001, ** p < .001, * p < .05

Table 5. Means, Standard Deviations, and Correlations for Variables in the Study for Asian Americans (N = 62)

	Asian Americans																	
	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Instrum	6.17	1.33	—															
2. Executive	2.17	1.30	-.74***	—														
3. Avoidance	2.33	1.21	-.42**	.53***	—													
4. Benefits	5.08	1.56	.14	-.09	-.14	—												
5. Self-effic	7.08	1.29	.19	-.15	-.02	.12	—											
6. Self-conc	5.76	1.33	.48***	-.46**	-.38*	.11	.52***	—										
7. Anxiety	3.15	1.71	-.31	.39*	.29*	-.10	-.63***	-.74***	—									
8. Task goals	6.04	1.46	.49***	-.34*	-.29*	.50***	.21	.53***	-.35*	—								
9. Perf-appro	5.68	1.58	.11	-.03	-.02	.11	.09	.08	.12	.33*	—							
10. Perf-avoid	3.49	1.71	-.17	.30*	.17	.07	.04	-.13	.28*	.00	.58***	—						
11. Self-reg	5.65	1.34	.43**	-.36*	-.25	.36*	.50***	.70***	-.56***	.65***	.08	-.12	—					
12. Value	5.82	1.57	.57***	-.42**	-.32*	.22	.34*	.71***	-.50***	.70***	.11	-.13	.65***	—				
13. Masculin	6.29	1.13	.35*	-.25	-.25	.12	.31*	.40*	-.32*	.42**	.16	.06	.36*	.45**	—			
14. Femininity	6.13	0.92	.12	-.11	-.21	.20	-.07	-.07	.05	.21	.20	-.11	.15	.07	.00	—		
15. Achievem	3.05	0.93	.34*	-.32*	-.32*	-.00	.43**	.60***	-.40*	.39*	.25	-.08	.48***	.45**	.29*	-.01	—	
16. Gender	0.73	0.45	.01	-.02	.08	-.14	.43**	.18	-.18	.12	.05	.07	.16	.18	.48***	-.42**	.27*	—

Note: With the exception of Achievement, all variables were assessed on a Likert-type scale with a response format of 1 (low) to 8 (high). Achievement was assessed with a scale that ranged from 0 (low) to 4 (high). *** $p < .0001$, ** $p < .001$, * $p < .05$

students and Asian American students, however, perceived value did not correlate with perceived benefits of help-seeking; for White students, value and avoidance of help-seeking did not correlate. For Asian American students, self-efficacy for self-regulation and avoidance of help-seeking did not correlate. For White students, self-efficacy correlated positively with instrumental help-seeking and negatively with executive help-seeking, and avoidance of help-seeking; for African American students, self-efficacy correlated positively with perceived benefits and negatively with executive help-seeking; self-efficacy did not correlate with any of the help-seeking variables for Asian American students.

Research Questions

Prediction cf Help-Seeking Variables

The first objective of this investigation was to determine the predictive value of motivational variables frequently used in the study of academic help-seeking on instrumental help-seeking, executive help-seeking, avoidance of help-seeking, and perceived benefits of help-seeking. To this end, six simultaneous multiple regressions were conducted, one for the total sample, one each for boys and for girls, and one each for White students, African American students, and Asian American students. Results are provided in Tables 6 and 7.

The most important finding is that achievement goal orientations proved to be the most powerful predictors of academic help-seeking in the computer science classroom. Most prominent among these findings concerns the role of task goal orientation. For the total sample, task goals predicted each of the four help-seeking variables ($\beta = .610$ for instrumental help-seeking, $\beta = .-421$ for executive help-seeking,

Table 6. Beta Coefficients and Structure Coefficients for Boys, Girls, and Total Sample

Variable	Boys (n = 250)								Girls (n = 64)								Total Sample (N = 314)							
	Instr		Exec		Avoid		Benefit		Instr		Exec		Avoid		Benefit		Instr		Exec		Avoid		Benefit	
	β	S	β	S	β	S	β	S	β	S	β	S	β	S	β	S	β	S	β	S	β	S	β	S
Self-efficacy	-.08	.277	.13	-.284	.07	-.215	.06	.254	-.30	.253	.15	-.304	.03	-.522	.48	.618	-.10	.265	.14	-.280	.04	-.306	.18	.366
Self-concept	.03	.539	-.15	-.686	.15	-.368	-.15	.233	.27	.688	-.03	-.585	-.35	-.824	.01	.590	.04	.563	-.09	-.671	.05	-.489	-.14	.284
Anxiety	.08	-.385	-.03	.552	.03	.368	.19	-.021	-.25	-.597	.33	.725	-.09	.522	.31	-.365	.03	-.398	.05	.559	-.05	.398	.24	-.061
Task	.66	.955	-.46	-.903	-.21	-.736	.48	.846	.38	.869	-.27	-.795	-.11	-.643	.35	.758	.61	.978	-.42	-.914	-.18	-.734	.44	.833
Perf-Approach	.05	.216	.04	-.050	-.01	-.153	.07	.402	.02	.018	-.01	.047	-.11	-.060	-.21	-.183	.04	.182	.03	-.019	-.03	-.122	-.01	.224
Perf-Avoid	-.18	-.308	.18	.452	.15	.429	-.06	.021	.04	-.163	-.03	.187	.28	.643	.08	-.140	-.12	-.298	.12	.429	.18	.550	-.02	-.020
Self-Reg	-.03	.600	-.09	-.702	-.21	-.706	.12	.550	-.03	.670	-.02	-.678	-.00	-.703	.33	.786	-.02	.613	-.08	-.709	-.19	-.765	.20	.630
Achievement	-.00	.277	.01	-.301	.05	-.184	-.07	.127	-.08	.145	.14	-.023	-.01	-.422	-.24	.112	-.01	.249	.03	-.261	.03	-.245	-.13	.10
R^2	.42		.36		.11		.22		.31		.18		.25		.51		.36		.29		.11		.24	

Table 7. Beta Coefficients and Structure Coefficients for White Students, African American Students, and Asian American Students

Variable	Whites (n = 142)								African Americans (n = 82)								Asian Americans (n = 62)							
Self-efficacy	.05	.265	.01	-.298	-.30	-.529	.30	.388	-.38	.275	.29	-.444	-.02	-.449	.19	.607	.01	.325	.13	-.269	.32	-.041	.14	.201
Self-concept	.10	.500	-.13	-.579	.22	-.126	-.21	.073	-.03	.506	-.07	-.698	.16	-.449	-.09	.523	.36	.821	-.28	-.824	-.21	-.776	-.28	.185
Anxiety	.26	-.359	-.22	.480	-.27	.050	.34	.073	-.08	-.449	.08	.555	-.00	.449	.17	-.321	.12	-.530	.14	.698	.23	.592	.02	-.168
Task	.68	.953	-.50	-.910	-.20	-.454	.31	.558	.69	.883	-.43	-.936	-.33	-.813	.48	.911	.30	.838	-.09	-.609	-.11	-.592	.60	.839
Perf-Approach	-.07	.031	.16	.132	.10	-.050	-.07	.170	.15	.347	-.07	-.286	-.16	-.407	.17	.489	.09	.188	-.17	-.054	-.01	-.041	-.10	.185
Perf-Avoid	-.06	-.344	.11	.480	.13	.403	.02	-.073	-.18	-.362	-.04	.159	.26	.556	-.08	-.118	-.21	-.291	.31	.537	.06	.347	.09	.117
Self-Reg	.03	.531	-.17	-.318	-.27	-.554	.29	.509	.01	.593	-.30	-.809	-.08	-.642	.08	.709	.01	.735	-.02	-.645	.06	-.511	.21	.604
Achievement	-.09	.094	.04	-.149	.09	-.202	-.12	.073	.14	.318	-.03	-.333	-.01	-.407	-.03	.371	.01	.581	-.05	-.573	-.22	-.653	-.18	-.000
R^2	.41		.36		.16		.17		.48		.40		.22		.35		.34		.31		.24		.36	

Beta values and R^2 in bold indicate that p < .05

β = -.177 for avoidance of help-seeking, and β = .445 for perceived benefits of help-seeking). Task goals also predicted each help-seeking variable for boys and for African American students. For White students, task goals predicted instrumental help-seeking, executive help-seeking, and perceived benefits of help-seeking but did not predict avoidance of help-seeking. Task goals positively predicted instrumental help-seeking and perceived benefits of help-seeking and negatively predicted executive help-seeking and avoidance of help-seeking for all groups. As expected, a performance-avoid goal orientation was a negative predictor of instrumental help-seeking (β = -.125) but was positively related to executive help-seeking (β = .125) and avoidance of help-seeking (β = .184).

Task goals were not similarly predictive for boys and for girls. Whereas for boys they predicted each help-seeking variable, for girls they predicted only instrumental help-seeking and perceived benefits. Note, however. that it is likely that the negative relationship between task goals and executive help-seeking in the female sample (β = -.269) did not reach significance because of the modest sample size. Both the correlations (r = -.34) and standardized beta coefficient suggest that these variables are associated for boys and for girls. It bears noting that task goals were not negatively associated with avoidance of help-seeking for girls. The predictive pattern for the performance-avoid goals followed that of the total sample. For girls, however, performance-avoid goals predicted only avoidance of help-seeking (β = .284). Performance approach goals exercised no influence on students' help-seeking, either for the full sample or by gender and race/ethnicity.

The adaptive function of a task goal orientation was also evident from results of the multiple regression analyses by race/ethnicity. For African American students, this goal orientation powerfully predicted each of the academic help-seeking variables. For White students, however, as for girls, task goals were not associated with avoidance of help-seeking. For Asian American students, task goals predicted only perceived benefits of help-seeking, although the zero-order correlation (r = .49) with instrumental help-seeking and structure coefficient (S = .838) suggest that the modest sample size was responsible for the standardized beta coefficient (β = .305) failing to reach significance. Performance-avoid goal orientation was positively associated only with avoidance of help-seeking for African American students (β = .264). The reduced sample size of the groups by race/ethnicity prevented performance-avoid goals from exercising the influence seen in the total sample. For example, the structure coefficient suggested that performance-avoid goals were associated with executive help-seeking of Asian American students (β = .306).

Although findings make clear that task goal orientation and performance-avoid orientation were the most prominent predictors of the help-seeking variables for all groups and for the total sample, some of the motivation variables also exercised an influence. For example, self-efficacy for self-regulation positively predicted perceived benefits of help-seeking and negatively predicted avoidance of help-seeking for the total sample and for White students. It was also negatively related to avoidance of help-seeking for boys (β = -.205). For the total sample, computer science grade self-efficacy (β = .175) predicted perceived benefits of help-seeking. That is, students with greater confidence in their computer science capabilities were more likely to see the benefits of help-seeking. It

was clear, however, that self-efficacy beliefs exercised an influence primarily because of

the strength of their relationship with perceived benefits of help-seeking of White

students (β = .302) and of girls (β = .476). For White students, self-efficacy was also

negatively associated with avoidance of help-seeking (β = -.297), which is to say that

those with greater confidence were less likely to avoid seeking help. Computer science

self-concept was not predictive of any of the academic help-seeking measures.

Some findings were not anticipated and merit attention. First, I found it curious

that self-efficacy beliefs were a powerful *negative* predictor of the instrumental help-

seeking of African American students (β = -.379). That is, to the degree that African

American students are more confident, they are less likely to seek instrumental help. In

addition, computer science anxiety was *positively* associated with perceived benefits of

help-seeking for the total sample (β = .239), for White students (β = .338), and for girls

(β = .310). That is, the greater anxiety that students experience, the more likely they were

to highly rate the benefits of help-seeking. Moreover, for White students, computer

science anxiety was also positively associated with instrumental help-seeking (β = .258),

which is to say that the greater anxiety White students reported, the more likely they were

to seek instrumental help. Although the weak structure coefficients suggest that these

relationships may in part be due to multicollinearity with other motivation variables, these

unexpected significant effects bear reflection.

To help explain the unexpected findings regarding anxiety and the self-efficacy of

African American students, I conducted simultaneous multiple regression using the

quadratic terms of self-efficacy and anxiety in models predicting the instrumental help-

seeking of African American students, the perceived benefits of help-seeking for the total

sample, White students, and girls, and the instrumental help-seeking of White students. Results revealed that, for the total sample (β = -.449) and for White students (β = -.801), computer science anxiety had a significant quadratic relationship with perceived benefits. The inverted U relationship shows that moderate levels of anxiety were related to greater perceived benefit, whereas too little or too much anxiety were related to lower perceived benefit. This was not the case for girls, however. In this case, the more anxious the girls were, the higher they rated perceived benefits of help-seeking. In addition, for African American students, computer science grade self-efficacy had a significant quadratic relationship with instrumental help-seeking (β = -.801). In this case, a U relationship showed that students with lower and higher levels of self-efficacy were more likely to seek instrumental help, whereas those with moderate self-efficacy were less likely to seek instrumental help. The relationship between instrumental help-seeking and anxiety for White students was linear, which is to say that the more anxious the White students were, the more likely they were to seek instrumental help.

Students' achievement in computer science, assessed through ratings provided by their computer science teachers, did not predict instrumental help-seeking, executive help-seeking, or, importantly, avoidance of help-seeking. It exercised a modest negative influence on perceived benefits of help-seeking for the total sample (β = -.130). In general, more competent students were less likely to find help-seeking beneficial.

Differences by Gender and/or Ethnicity

The second objective of the investigation was to determine whether mean scores on instrumental help-seeking, executive help-seeking, avoidance of help-seeking, and perceived benefits of help-seeking differed by gender or by ethnicity. Multivariate

analysis of variance (MANOVA) with gender, ethnicity (White, African American, Asian American), and the interaction of gender and ethnicity revealed no significant multivariate effect for any of the help-seeking variables, Wilks' lambda= .99, F = .90 (4,277), p = .4616, for gender; Wilks' lambda= .98, F = .86 (8,554), p = .5523, for ethnicity; Wilks' lambda= .99, F = .46 (8,554), p = .8822, for their interaction. In other words, average scores on each of the help-seeking variables did not differ by group membership. Results are provided on Table 8.

Role of Gender Orientation

The final objective of the study was to determine whether gender differences in academic help-seeking could be accounted for by gender orientation beliefs. Because there were no significant gender differences in academic help-seeking, this analysis was not conducted.

Additional Findings

Public versus Private School Findings

Although the three questions posed in this study represent the substantive issues of interest, other findings merit noting. For example, data were gathered from public (n = 236) and from private (n = 78) school students, and I was interested in discovering whether mean scores on the help-seeking, motivation, and achievement variables differed as a function of type of school. MANOVA results revealed a significant multivariate effect for type of school, Wilks' lambda = .82, F = 3.70 (17,289), p < .0001. Interestingly, students in public and private schools did not differ in any of the help-seeking variables. Private school students had a higher mean self-concept, lower computer science anxiety, valued computer science to a greater degree, and were rated as stronger computer science students by their teachers.

Table 8. Multivariate Analysis of Variance (MANOVA) of Help-Seeking Variables by Gender and Ethnicity

Variable	Boys (n = 250)		Girls (n = 64)		Whites (n = 142)		African Americans (n = 82)		Asian Americans (n = 62)		Total (N = 314)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Instrumental Help-Seeking	6.04	1.36	6.21	1.29	6.06	1.32	6.07	1.44	6.17	1.33	6.08	1.35
Executive Help-Seeking	2.18	1.18	2.12	1.22	2.21	1.14	2.15	1.23	2.17	1.30	2.17	1.19
Avoidance of Help-Seeking	2.29	1.14	2.07	1.19	2.35	1.20	1.97	0.93	2.33	1.21	2.25	1.15
Perceived Benefits of H.S.	5.15	1.62	5.64	1.75	5.12	1.62	5.54	1.78	5.08	1.56	5.25	1.66

Note: There were no mean differences reported as the result of Multivariate Analyses of Variance (MANOVA).

Differences in Motivation by Gender and/or Ethnicity

Although the focus of the study was on the help-seeking variables, I was also interested in exploring whether mean scores on the motivation and achievement variables differed as a function of gender and ethnicity. Consequently, a MANOVA was conducted, with self-efficacy, self-concept, anxiety, the achievement goal orientations, self-efficacy for self-regulation, and teacher ratings of ability as dependent variables and gender, ethnicity, and their interaction as independent variables. There were multivariate effects for gender, Wilks' lambda= .92, F = 2.33 (10, 264), p = .0121, and for ethnicity, Wilks' lambda= .84, F = 2.47 (20,528), p = .0004. The interaction term was nonsignificant. Results are provided on Table 9. Univariate analyses showed that boys reported stronger self-efficacy (M = 7.0), self-concept (M = 6.1), self-efficacy for self-regulation (M = 5.8), and value (M = 6.2) than did girls (M = 6.3 self-efficacy; M = 5.3 self-concept; M = 5.3 self-efficacy for self-regulation; M = 5.4 value). Boys also reported lower anxiety (M = 2.7 boys, M = 3.9 girls). There were no gender differences in the achievement goal orientations or in actual achievement.

White and Asian American students reported stronger performance-approach goals (M = 5.4 White; M = 5.7 Asian American) than did African American students (M = 4.7). Asian American students had stronger performance-avoid goals (M = 3.5) than did African American students (M = 2.7). The three ethnic groups differed significantly from each other in computer science achievement. Teachers rated White students as more capable (M = 3.4), followed by Asian American students (M = 3.0), and by African American students (M = 2.6). Results are provided on Table 9.

Influence of Teachers' Gender

MANOVA analyses were also conducted to determine whether help-seeking, motivation, and achievement scores differed for boys and girls as a function of their teacher's gender. This was prompted by findings suggesting that girls with male teachers as encouraging models actually possess stronger motivation than do girls with female teachers as encouraging models (Schunk & Miller, in press). Alternatively, there are findings suggesting that female teachers in masculine domains provide girls with positive role models that work to increase the girls' motivation and achievement (Bandura, 1997). The MANOVA detected a multivariate effect for the influence of teacher gender, Wilks' lambda = .78, $F(39,874) = 2.00$, $p = .0003$. As regards help-seeking, the key, and rather dramatic, finding was that girls with female teachers were more likely to seek instrumental help ($M = 6.7$) and less likely to seek executive help ($M = 1.8$) than were girls with male teachers ($M = 5.6$ for instrumental; $M = 2.6$ for executive). There were no differences either in avoidance of help-seeking or perceived benefits of help-seeking. As regards motivation and achievement, differences between girls with male teachers and girls with female teachers were nonsignificant. In my sample, 37 girls had a female teacher and 27 a male teacher; 92 boys had a female teacher and 128 a male teacher.

Differences by Grade Level

MANOVA results revealed no differences in help-seeking, motivation, or achievement in computer science as a function of grade level. In other words, average scores on the variables in the study did not differ for students in grades 8–12. In my sample there were 4 students in Grade 8, 17 students in Grade 9, 26 students in Grade 10, 143 students in Grade 11, and 124 students in Grade 12.

Table 9. Multivariate Analysis of Variance (MANOVA) of Motivation and Achievement Variables by Gender and Ethnicity

Variable	Boys (n = 250)		Girls (n = 64)		Whites (n = 142)		African Americans (n = 82)		Asian Americans (n = 62)		Total (N = 314)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Self-efficacy	6.95 a	1.43	6.33 b	1.78	7.08	1.25	6.38	1.90	7.08	1.29	6.82	1.53
Self-concept	6.06 a	1.33	5.27 b	1.29	6.19	1.27	5.59	1.52	5.76	1.33	5.90	1.36
Anxiety	2.74 a	1.57	3.88 b	1.85	2.61	1.58	3.34	1.86	3.15	1.71	2.97	1.69
Task goals	6.17	1.41	5.78	1.43	6.23	1.19	5.91	1.73	6.04	1.46	6.09	1.42
Performance-approach	5.32	1.65	4.95	1.78	5.38 a	1.70	4.73 b	1.60	5.68 a	1.58	5.24	1.68
Performance-avoid	2.98	1.57	3.19	1.69	2.95 ab	1.53	2.75 a	1.55	3.49 b	1.71	3.02	1.59
Self-regulation	5.81 a	1.35	5.27 b	1.56	5.87	1.22	5.55	1.72	5.65	1.34	5.70	1.41
Value	6.18 a	1.49	5.35 b	1.58	6.33	1.26	5.68	1.85	5.82	1.57	6.01	1.54
Achievement	3.09	1.02	2.88	1.03	3.39 a	0.79	2.57 b	1.19	3.05 c	0.93	3.05	1.02

Note: Mean differences reported are the result of Multivariate Analyses of Variance (MANOVA). Group means for a dependent variable (row) that are subscripted by different letters are statistically different (experimentwise $\alpha \leq .05$) computed on an effect identified by MANOVA.

CHAPTER V
SUMMARY AND CONCLUSIONS

The primary objective of this investigation was to determine the degree to which constructs prominent in the area of academic motivation would predict executive help-seeking, instrumental help-seeking, perceived benefits of help-seeking, and avoidance of help-seeking in the context of a high school computer science classroom. Because findings regarding gender or ethnicity differences in academic help-seeking have not been consistent, I also sought to discover whether average scores on these four help-seeking variables would differ by gender and/or by ethnicity. Because motivation researchers have shown that some gender differences in academic motivation variables are a function of gender orientation beliefs rather than of gender, I also sought to discover whether gender differences in academic help-seeking could be accounted for by gender orientation beliefs. Help-seeking scales with strong empirical qualities were required to meet these objectives. Because such scales are not available in the literature, especially as regards instrumental help-seeking and executive help-seeking, a prerequisite to meeting the objectives of the investigation was to construct appropriate scales with which to measure these key constructs.

I believe that the instrumental and executive help-seeking scales created for use in this study, as well as the help avoidance and benefits of help-seeking scales adapted, represent a major contribution to the literature on academic motivation in general and to

academic help-seeking in particular. Results of exploratory factor analyses, supplemented

by reliability estimates, intercorrelations, and correlations with motivation variables,

showed that each of the four scales has stronger psychometric properties than do scales

currently in use by help-seeking researchers. Moreover, to strengthen their construct

validity, both the instrumental help-seeking and executive help-seeking items were

created to more faithfully reflect the conceptual definitions of these constructs. In

addition, I sought to balance items to reflect seeking help from teachers and seeking help

from classmates. Finally, including in each item the root "When I ask for help in this

class, . . ." eliminated problems present in items from other scales that created confounds

in students' responses. As regards the adapted scales—avoidance of help-seeking and

benefits of help-seeking—items were carefully selected and adapted from various

previously used scales to again reflect the conceptual definitions of these constructs.

Consequently, in addition to sound reliability, these efforts resulted in each of the four

scales possessing strong construct validity. It bears noting that the help-seeking scales

used in this study could easily be adapted for use both in other computer class contexts

and in other academic areas.

One of the instrumental help-seeking items failed to load ("When I am having

trouble and ask the computer science teacher for help, I like to be given examples of

similar problems we have done."). This item proved problematic for a number of reasons.

First, it was one of only three items on this scale that did not provide an alternative to the

type of instrumental help sought (e.g., "When I ask the teacher for help with something I

don't understand, I ask the teacher to explain it to me rather than just give me the

answer."). The other two items without explicit alternatives strongly implied them (". . . I

don't want that student to give away the whole answer."; ". . . I only want as much help as necessary to complete the work myself."). In addition, the problematic item was the only teacher item on either the instrumental or the executive help-seeking scales that did not parallel a student item. This was due to the fact that the teacher items were created first, with parallel student items to follow. In this case, a parallel student item provided an unlikely scenario, as students typically do not provide each other with examples of similar problems. Consequently, I created a non-parallel student item. In retrospect, it would have been better to parallel the student item ("When I ask a student for help with my computer science work, I don't want the student to give away the whole answer."), which loaded strongly on the instrumental scale. Thus a suitable replacement for the item that failed to load would be "When I ask my teacher for help with my computer science work, I don't want my teacher to give away the whole answer." This would result in a 10-item instrumental help-seeking scale consisting of 5 teacher items and 5 student items conceptually balanced.

As regards the prediction of academic help-seeking in the computer science classroom by motivation and achievement variables, if any finding comes through with resonance it is the role played by achievement goals, which are the reasons that students provide for engaging in academic tasks and activities. It comes as no surprise that a task goal orientation was positively associated with adaptive behaviors such as instrumental help-seeking and negatively associated with maladaptive behaviors such as executive help-seeking and avoiding help-seeking. Students with a task goal orientation engage their academic work with the aim of mastering the material and ideas and seeking academic challenge. For these students, learning is an end in itself. It is consistent with

the "love of the task" nature of holding a task goal orientation that students who engage in academic work for intrinsic reasons should be more likely to seek the type of instrumental help that will enrich the experience of learning, more readily view the benefits of seeking help so as to deepen their understanding, less likely to seek the executive type of help that will merely provide a short-cut to getting the correct answer, and less likely to avoid help in general.

For reasons embedded in achievement goal theory, it also comes as no surprise that a performance-avoid goal orientation was negatively associated with instrumental help-seeking and positively associated with executive help-seeking and avoidance of help-seeking. Students who hold a performance-avoid goal orientation do their academic work primarily because they fear appearing incompetent. Students whose achievement efforts are grounded on the fear of appearing incompetent, being embarrassed, or looking stupid are quite naturally prone to view decisions about seeking academic help through the lens which that fear provides. It is logical that students whose main reason for doing their academic work is grounded in fear of failure should be more likely to avoid seeking help. Such students are likely to view help-seeking as an academic behavior that their classmates, and perhaps even their teachers, will interpret as something that only a student who *needs* help would do. And when they must seek help, their fear of being viewed negatively will move them to seek the type of executive help that they believe will work to minimize potential failure.

Students who hold a performance-approach goal orientation want to do better than their classmates so that they will be recognized as competent by their peers, teachers, and parents. In this study, a performance-approach orientation was not associated with the

help-seeking variables. Taken together, these findings support the contentions of researchers regarding the adaptive function played by task goals and the negative influence of performance-avoid goals. Researchers who have been calling for investigations that discriminate between performance-approach and performance-avoidance in studies of achievement goal orientation (e.g., Elliot, & Harackiewicz, 1996; Middleton & Midgley, 1997; Pajares, 2001; Urdan, 1997) will be heartened by these findings. Moreover, this distinction would have helped to clarify findings of other researchers who measured only performance goals (sometimes called relative ability goals) as an entity (Ryan et al., 1997; Ryan & Pintrich, 1997).

Given the adaptive help-seeking that is associated with a task goal orientation and the maladaptive help-seeking associated with a performance-avoid goal orientation, it seems logical that teachers should work to encourage a task goal orientation both in their classrooms and in their schools and to discourage a performance-avoid goal orientation. This would entail helping students learn to appreciate the benefits of learning for its own sake, to focus on understanding the material at hand, and to view difficulties as part of the learning process. Teachers would also do well to teach interesting, meaningful lessons that inspire students' interest and focus attention on the task itself, as well as to minimize the emphasis on grade competition.

Findings from this investigation lend partial support to the *vulnerability hypothesis*, the view that students with low competence or low self-efficacy are unlikely to seek help because this admission of failure makes it difficult to maintain an impression of competence. For White students, self-efficacy beliefs were negatively associated with avoidance of help-seeking. However, neither self-efficacy nor achievement was

associated with avoidance of help-seeking for African American or for Asian American students, calling into question the vulnerability hypothesis in these populations. Conversely, findings offer no support for the *consistency hypothesis*, the contention that self-efficacious or competent students tend to ask fewer questions because the admission that they need help is inconsistent with their self-views of competence. Had the motivation and achievement variables accounted for more of the variance in avoidance of help-seeking, I would have suggested that perhaps achievement and self-efficacy might not be the critical predictive variables of avoidance of help-seeking that help-seeking researchers have believed. Given the modest power of the models used to predict avoidance of help-seeking, however, and because students' achievement was consistently strong, it seems safer to suggest that further study of these variables in predicting avoidance of help-seeking in elective courses is warranted.

Researchers have typically reported that motivation variables such as self-efficacy and academic self-concept are related to adaptive help-seeking practices (Karabenick & Knapp, 1988b; Nadler, 1986b, 1997; Nelson-Le Gall & Jones, 1990). In the present study, the motivation variables typically did not prove predictive in a model that included task goal and performance-avoid orientation. One possible explanation for the weakness of the motivation and achievement variables in predicting help-seeking is that the computer science classes that comprised this study were elective in nature. Consequently, students who chose to enroll in these courses were no doubt both highly motivated to achieve in these classes and did achieve (the average teacher rating was 3.05, or a B). This sample differs markedly from the typical "captured audience" of students enrolled in required classes and possessing a wider range of motivation and achievement.

Although findings regarding gender differences in academic help-seeking have

been inconsistent (Good et al., 1987; Nadler & Fisher, 1986) , I expected to find that boys

and girls taking computer science would differ in their help-seeking preferences. This was

in great part due to the fact that gender differences in academic motivation favoring boys

are typically found in areas related to mathematics, science, and technology (see Hackett,

1995; Pajares, 1997; Wigfield, Eccles, & Pintrich, 1996). Some researchers have found a

qualitative difference in help-seeking between boys and girls such that, in male-oriented

settings, girls are likely to seek more instrumental help and less executive help than are

boys (Nelson-Le Gall, 1987; Nelson-Le Gall & Glor-Scheib, 1985). In the present study,

however, the mean scores of girls and boys did not differ on any of the help-seeking

scales. Because there were no gender differences in academic help-seeking, the

hypothesis that these differences would be accounted for by gender orientation could not

be tested.

Although there were no differences in academic help-seeking by gender, there

were gender differences in motivation and achievement. Girls reported lower self-

efficacy, self-concept, self-efficacy for self-regulation, and value than did boys. Girls also

reported higher anxiety. These findings are consistent with those of self-concept and self-

efficacy researchers who often find these differences in areas such as mathematics and

science (see Britner & Pajares, 2001; Pajares, 1997). These findings stand in stark

contrast to the fact that the computer science skills of the boys and girls enrolled in the

classes were judged equally capable by their teachers. In other words, girls reported lower

motivation despite computer science capabilities that were as strong as those of the boys.

It is possible, of course, that the difference between boys' and girls' motivation in computer science may be the result of factors unrelated to motivation. For example, many gender differences in academic self-beliefs disappear when previous achievement is controlled (see Pajares, 1996b). In other words, when researchers analyze the self-beliefs of students at the same level of academic competence, fewer differences in self-belief emerge. Because I was unable to obtain a measure of previous achievement, I was unable to examine this possibility. A second factor that may be responsible for gender differences in motivation is the tendency of boys and girls to respond to self-report instruments with a different "mind set." Researchers have observed that boys tend to be more "self-congratulatory" in their responses whereas girls tend to be more modest (Wigfield et al., 1996). As regards self-efficacy, for example, boys are more likely to express confidence in skills they may not possess and to express overconfidence in skills they do possess. Noddings (1996) suggested that boys and girls may well use a different "metric" when providing confidence judgments, adding that these sorts of ratings may represent more of a promise to girls than they do to boys. If this is the case, actual differences in motivation are masked or accentuated by such response biases.

A third factor potentially at play in creating differences between boys and girls in variables such as self-efficacy and self-concept has to do with the manner in which gender differences in these variables are typically assessed. For example, as regards self-efficacy and self-regulation, students are asked to provide judgments of their confidence that they possess certain academic skills or that they can engage in specific self-regulatory strategies. Differences in the average level of confidence reported are interpreted as gender differences in self-efficacy. Pajares and his colleagues (Pajares et al., 1999;

Pajares & Valiante, 1999) asked students to provide self-efficacy judgments in the traditional manner but also to compare their academic ability versus that of other boys and girls. Although girls outperformed boys in language arts, girls and boys reported equal writing self-efficacy and self-efficacy for self-regulation. When students were asked whether they were better writers than their peers, however, girls expressed that they were better writers than were the boys in their class and even in their school. That is, regardless of the ratings that boys and girls provided on the self-efficacy measures, it was clear that girls considered themselves better writers than the boys.

The factors that help confound gender differences in academic motivation help temper concerns about the girls' lower self-beliefs and higher anxiety. Consequently, interventions to raise the self-efficacy and self-concept of girls, as well as lower their anxiety, in high school computer science classes may or may not be warranted. It bears adding that, although boys reported stronger motivation than did girls, the differences were in each case modest. Moreover, mean scores for girls in self-efficacy, self-concept, self-efficacy for self-regulation, and value ranged from 5.3 to 6.3 on the 8-point Likert scale, suggesting that they held reasonably positive beliefs in each of these areas. In addition, the modest score of 3.9 reveals that their computer science anxiety should not be viewed with alarm. Finally, although having a female teacher as a role model was associated with higher instrumental help-seeking and lower executive help-seeking, there were no differences in motivation between girls with female teachers and girls with male teachers. Therefore any interventions considered should go beyond role modeling.

When "real" gender differences are in evidence, they can arise as a function of home, cultural, educational, and mass media influences. Parents often underestimate their

daughters' academic competence and hold lower expectations for them (Phillips &

Zimmerman, 1990). Parents also often portray mathematics and science as male domains

(Meece & Courtney, 1992). As girls enter middle and high school, the perception of

mathematics as a masculine domain may further weaken their interest in it. Well-

intentioned teachers may also hold different expectations for boys and girls. In some

cases, elementary and middle school teachers—most of whom are women—may convey

to girls that areas such as mathematics and computer science may be difficult for them.

School counselors also may discourage girls from pursuing scientific or technical

occupations (Betz & Fitzgerald, 1987). The media continue to purvey subtle (and not so

subtle) messages that entrench stereotypical gender conceptions. These messages range

from reinforcing traditional gender roles to gender-dominated domains, sometimes

portraying men as leaders and authority figures and women as subordinate (Bandura,

1997). From a cultural perspective, peer cliques can powerfully influence students'

academic interests. Girls who want to be popular with peers may shun subjects and

activities perceived as masculine so that their popularity will not suffer.

Analyses predicting help-seeking by gender revealed that, with minor exceptions,

the same motivation variables predicted the help-seeking of boys and of girls. Task goals

were positively associated with instrumental help-seeking and perceived benefits of

help-seeking and negatively associated with executive help-seeking and avoidance of

help-seeking. Although in girls the regression coefficient showing the predictive value of

task goals on executive help-seeking and avoiding help-seeking failed to reach

significance, correlations and structure pattern coefficients suggested that, as for boys,

these goals were also negatively associated with seeking executive help and avoiding help.

The role of performance-avoid goals in the help-seeking of boys and girls proved more complex to interpret. For boys, performance-avoid goals were associated negatively with instrumental help-seeking and positively with executive help-seeking and avoidance of help-seeking. These are intuitive findings: to the degree that boys' reasons for doing their computer science work were embedded in fear of failure or embarrassment, they were more likely to seek the executive help that quickly put an end to their labors and less likely to seek the instrumental help that would prolong them. For girls, however, correlations, regression coefficients, and structure coefficients each confirmed that a performance-avoid orientation predicted avoidance of help-seeking but was unrelated both to seeking instrumental or executive help. The clarity of this finding is rather direct. The fear of appearing incompetent or of being embarrassed in their computer science class neither deters girls from seeking the instrumental help more likely to create an embarrassing moment nor does it lead them to seek the executive help that would serve to avert it.

If these findings are correct, it seems that girls enrolled in classes such as computer science do not permit their personal academic fears to interfere with the type of help they seek. This is particularly counterintuitive given that they are enrolled in male-oriented classes in which they are consistently in the minority, often overwhelmingly so. It also merits noting that there were no gender differences either in academic help-seeking nor in performance-avoid goals. A clear or theoretically founded explanation for this finding is not readily apparent. Perhaps, in male-oriented domains, girls are less

concerned with how their help seeking may be interpreted than they are with seeking the help required to succeed. After all, they know what they are getting into when they enter these environs. Rather, it is boys, who are typically viewed, and no doubt view themselves, as the masters in these domains, whose "face" is invested in how their help-seeking may be construed.

One additional divergence in the prediction of help-seeking for girls and for boys bears noting. Computer science self-efficacy and computer science anxiety predicted the perceived benefits of help-seeking for girls but not for boys. In other words, as girls grew more confident of their likely success in computer science class and more apprehensive about their computer programming skills, they were more likely to view help-seeking as beneficial. Two issues emerge. First, there is the differential effects by gender. For boys, self-efficacy and anxiety were each uncorrelated with perceived benefits of help-seeking and did not predict it. As regards self-efficacy, girls' perceptions of the benefits of seeking help in a computer science class increased commensurate with their self-perceptions about their own capabilities to succeed in that class. This finding, buttressed by the strong correlation and structure coefficient between self-efficacy for self-regulation and perceived benefits of help-seeking, reveals that girls with greater confidence in their academic skills and in their self-regulatory strategies viewed help-seeking as more beneficial. Social cognitive theorists would contend that perceived benefits of help-seeking is a construct similar to what they refer to as *outcome expectations*, which Bandura (1997) defined as individuals' judgments of the consequences of engaging in specific behaviors. Researchers have reported that self-efficacy and outcome expectations (as well as perceived usefulness of an outcome) are related. As I will discuss later, self-

efficacy and perceived benefits of help-seeking were also associated for White students in the sample.

Despite the presumed and theoretically grounded association between self-efficacy and perceived value of an academic outcome, boys perceive the benefits of help-seeking independent of their self-efficacy beliefs. The most parsimonious explanation is that the extremely high average self-efficacy that boys self-reported ($M = 6.95$, $SD = 1.43$ on an 8 point scale) attenuated the relationship between self-efficacy and perceived benefits of help-seeking for boys. Recall that boys are typically more confident about their academic capabilities than are girls, and this appears to be even more the case in a technology-related domain such as computer science.

As regards anxiety, the correlation between computer science anxiety and perceived benefits of help-seeking in girls was significantly negative; hence the positive effect in the regression model was due to its covariation with one or more of the independent variables. The nature of this covariation merits additional study in future investigations and bears disentangling.

Researchers investigating academic help-seeking as a function of ethnicity have either conducted homogeneous studies of African American students (Nelson-Le Gall & Jones, 1990) or heterogeneous studies in which no differences by ethnicity are found (Ryan et al., 1997). In the present study, I found no differences in the reported help-seeking or academic motivation of White students and African American students. Nonetheless, teachers rated White students as more capable in computer science than were African American students: White students were rated the equivalent of an A-, whereas African American students rated the equivalent of a C+. These teacher ratings

were consistent with the grades that students self-reported having received in computer science. These findings are consistent with Graham's (1994) summary of the literature on the academic motivation of African American students, which showed that they maintain optimism and positive self-regard in the face of social and economic disadvantage. Graham also found evidence that the motivation beliefs of African Americans are strong even in the face of often problematic achievement.

My findings are consistent with those of Britner and Pajares (2001), who reported that despite the fact that the science GPA of African American middle school students was substantially lower than that of their White peers, the African American students reported similar levels of science self-concept and confidence that they could engage in self-regulatory practices, did not suffer greater science anxiety, and valued science equally. It seems clear that African American students' motivation beliefs related to being a computer science student are not tied to their achievement in computer science.

Contrary to stereotypical beliefs about the achievement of Asian American students, in this case they were not the highest achievers. While outperforming their African American peers, their academic performance ranked second to that of White students. This is noteworthy primarily in terms of stereotype-busting.

The only other difference by ethnicity was that Asian American students reported a stronger performance-avoid goal orientation than did African American students. This finding is consistent with the stereotypical view of individuals in Asian and Oriental societies as being more concerned with issues of "face" than are individuals in Western societies. Asian American students were more concerned than their African American peers about appearing "stupid" in front of their teacher and peers.

Analyses predicting help-seeking by ethnicity revealed that, with minor exceptions, variables that predicted help-seeking for the total sample predicted the help-seeking of White students and of African American students. One exception was that computer science anxiety was associated with the instrumental help-seeking of White students. The most parsimonious interpretation of this finding is that, for these students, as students' anxiety grows, they are more likely to seek instrumental help, perhaps with an eye to reducing their anxiety.

Two quadratic effects provided interesting findings. First, White students with moderate levels of computer science anxiety found help-seeking more beneficial than did students with either high or low levels of anxiety. It is not unusual to find that anxiety and academic performance have this sort of quadratic relationship. It is informative that a similar relationship exists with perceived benefits of help-seeking, which, like performance, is a positive academic outcome. The relationship between instrumental help-seeking and anxiety for White students was linear, which is to say that the more anxious the White students were, the more likely they were to seek instrumental help. The other quadratic relationship showed that African American students with lower and higher levels of self-efficacy were more likely to seek instrumental help, whereas those with moderate self-efficacy were less likely to seek instrumental help. One possible explanation is that African American students with low self-confidence may view seeking instrumental help as a way to increase their confidence, whereas those with strong self-efficacy are secure enough in their capabilities to seek this adaptive type of help.

Results for African American and Asian American students should be viewed with caution, given the modest sample sizes. In some cases, structured regression

coefficients showed that nonsignificant beta values would likely have reached significance had the sample been larger. For example, task goals were not significantly related to the instrumental help-seeking of Asian American students, but the strong structure coefficient suggested that the two variables were indeed related. It is for these reasons that quantitative methodologists suggest that regression coefficients be supplemented with structure coefficients in multiple regression models (e.g., Thompson & Borello, 1985).

As with gender and ethnicity, there was no distinction between public school students and private school students on the help-seeking variables. Help-seeking researchers have heretofore not examined differences between these contexts, and this is an encouraging finding that calls for additional research. Perhaps one reason for this finding is that the computer science classes were all elective courses. They were also generally small classes, as enrollment is limited by the number of computers available to students.

Students of different grade levels did not significantly differ on any of the help-seeking variables. Although help-seeking researchers have typically reported help-seeking differences as a function of grade level, most investigations have focused on students below Grade 8 (e.g., Good et al., 1987; Good & Slavings, 1988; Zimmerman & Martinez-Pons, 1990). As I described in Chapter 2, many of these studies are either conducted in the laboratory (e.g., Graham & Barker, 1990; Newman & Schwager, 1993) or do not distinguish between types of help-seeking (e.g., Good & Slavings, 1988). In the present study, help-seeking did not differ as a function of grade level. As noted earlier, the

elective nature of the computer science classes resulted in a more homogeneous sample than those previously studies.

A number of methodological factors embedded in the study speak to its external validity and to the generalizability of its findings to students that comprise the population under investigation. First, the instruments were empirically reliable and valid. I have already discussed the psychometric and conceptual properties of the help-seeking scales. In addition, the motivation scales are equally reliable and have been used by prominent researchers in numerous investigations. The nature of the sample also enhances the generalizability of findings. Data were gathered from students in 21 classes at 9 schools (6 public and 3 private), and analyses were conducted separately for White students, African American students, and Asian American students. I believe that the sample was reasonably representative of typical students enrolled in computer science classes throughout the United States.

In addition to those already alluded to, other implications and recommendations emanate from this investigation. Although this study included personal motivation variables, it excluded contextual variables that affect help-seeking in the classroom. As Ryan and her colleagues have shown, contextual variables such as the classroom goal structure and social climate are related to students' help-avoidance (Ryan et al., 1998). For example, when students believe that their classroom is task goal oriented, they are less likely to avoid seeking help. Future research on academic help-seeking should include variables such as classroom goal structure (particularly students' perceptions of this structure) and the interpersonal climate of the classroom and school. As help-seeking is inherently social, and those students who are less comfortable socially or who are disliked

by their peers may avoid help-seeking for social reasons, future research should also incorporate measures of students' social competence and their social status among peers.

Qualitative research in the area of academic help-seeking is warranted. Many influences on a student's help-seeking are difficult to capture quantitatively. These include the rules that a teacher enforces concerning classroom interactions, the degree of friendship or comfort that a student has with other students and with the teacher, and even how the proximity of a student to a desired peer helper may affect the decision to seek help. Student interviews can provide rich descriptions of student perceptions of such environmental influences as well as of the reasons voiced by students for seeking or not seeking help. For example, in the present study, one student appended his survey with a hand-written note that read "I would love to ask questions, but the teacher is very abrasive with students asking questions. With a different teacher, I would have different answers to your questions." Class observations could be used to triangulate findings and would shed additional insights. Although observing class interactions was not part of this investigation, I was present in the classrooms after students had completed the surveys, sometimes for as much as 30 minutes. It was clear that some teachers in the present study were very open to student interactions during class time, but others did not permit student talking. A qualitative approach would offer insight into how class environments and teacher practices influence help-seeking in the classroom.

In a similar vein, it would be instructive to measure teacher ratings of students' help-seeking. These would either confirm students' reported perceptions or suggest that there may be a gap between students' beliefs and the actions their teachers report observing. If students are not accurately self-reporting their help-seeking preferences,

teachers' ratings would shed light on findings regarding the influence of motivation variables on a student's desire for instrumental or executive help. Teachers could identify students who are excessively dependent on help, perhaps by asking questions regularly with minimal forethought, and students who almost never ask questions, even when they may need assistance. This information would help provide a more complete picture of an adaptive help-seeker. Certainly, a student who asks for instrumental help when it is needed would be considered a more adaptive help-seeker than would a student who asks for instrumental help even before trying the work or one who seeks instrumental help but only as a last resort.

Findings from this investigation support the contention of motivation researchers who have called for separately assessing the approach and avoid components of performance goals (e.g., Elliot & Harackiewicz, 1996; Pajares et al., 2000). In the present study, performance-avoid goals were strongly associated with the help-seeking variables, whereas performance-approach goals were associated only with the executive help-seeking of White students. In addition, findings reinforce the importance of including a measure of the type of help that students seek (i.e., instrumental versus executive). The fact that students seek or avoid help under certain conditions tells only a fraction of the help-seeking story. Even if students equally avoid help-seeking, the student who ultimately seeks instrumental help is a more adaptive help-seeker than the student who ultimately seeks executive help.

Teachers should not only encourage instrumental help-seeking in their classrooms but also instruct students in the distinction between instrumental help and executive help. If students are aware of this distinction, they can be charged to assume greater

responsibility for their long-term learning and can also avoid seeking or providing the executive help that some teachers may deem as cheating in their classrooms. With this distinction between types of help clarified, students permitted to help each other and to interact while working would have the opportunity to practice the instrumental help-seeking skills they have been encouraged to employ.

Particularly in computer classes, in which students are frequently working alone at their computers and are rarely in a whole-class lecture, need for help can be high. Because teachers cannot possibly satisfy all requests for help, allowing and indeed encouraging adaptive peer help is invaluable. A teacher who includes the distinction between executive help and instrumental help on the syllabus, discusses this distinction with the class, and verbally encourages students to seek instrumental help, both from peers and from the teacher, would be establishing a classroom environment that inspires instrumental help-seeking. In a computer class, for example, teachers might instruct students that answers that include programming commands or provide lines of code would be considered executive help (and perhaps cheating), whereas "why" and "how" questions—as long as they were answered in the spirit in which they were asked—would be considered instrumental help. Teachers who commended both the help-seeker and the help-provider for their instrumental help exchanges would further encourage such interactions. Students who perceive their teachers as supportive of help-seeking are less likely to avoid help, more likely to seek instrumental help, and importantly, no more likely to seek executive help (Arbreton, 1993; Karabenick & Sharma, 1994a).

Teachers would also benefit from asking students about their goal orientations at appropriate junctures in the course. If a student is known to possess a performance-avoid

goal orientation, then interventions could naturally be targeted toward that student. One possible intervention would be to pair students with performance-avoid goal orientations with students with high task-goal orientations on a long-term, challenging project that would benefit all students in the class. As the course progresses, teachers could also collect anonymous surveys on student perceptions of the classroom goal structure and the teacher's supportiveness of academic help-seeking. A teacher could distribute a survey with a Likert-type scale asking such questions as "How supportive is your teacher of students asking for help?" "Does your teacher recognize students for trying hard?" and "Does your teacher display the work of the best students as an example?" (Ryan et al., 1998). Student perceptions help shape student attitudes and actions. If students convey the message that they view the classroom as performance goal oriented, the teacher could take steps toward developing a task goal orientation using practices such as those described earlier.

Classrooms of the future will surely be filled with computers. Students will bring their personal handheld computers to class or sit down to a desktop computer. Every class—whether it be a biology, art, English, or music appreciation class—will have a computer as a key instructional tool. In many ways, the dynamic of every classroom will resemble the computer science classes that comprised this study. Many such classrooms already exist. Consequently, this is a critical time to begin to understand the nature of the help-seeking student in such a setting. But findings from this study are not only relevant because they speak to the types of classes most likely to exist in the future. They are relevant also to the "elective" courses so prominent in high schools and universities. Elective high school computer science classes bear a striking resemblance to college

classes, in which students are given great flexibility in course selection. The presence of computers and the elective nature of the classes in this study combine to make results both relevant and easily generalizable.

Particularly now, when reliable scales for executive help-seeking and instrumental help-seeking are available, it is important to distinguish the types of students and the types of classrooms that are likely to employ instrumental help-seeking techniques. If teachers promote the benefits of seeking instrumental help and discourage students from avoiding help-seeking, more students will have yet another self-regulatory strategy available to them to help in problem solving. A challenge for all educators is to continue to find ways to promote instrumental help-seeking in every classroom at every level of schooling.

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APPENDIX A
INSTRUMENT USED IN THE STUDY

1. Computer Science Grade Self-Efficacy scale is on the top of p. 4, items 1–5.

2. Gender Orientation scale is on p. 5 of the instrument, items 1–20.

   • masculinity items are 6, 7, 9, 10, 12, 13, 14, 16, 17, 19

   • femininity items are 1, 2, 3, 4, 5, 8, 11, 15, 18, 20

3. Instrumental Help-Seeking scale is on pp. 2–3, items 1, 3, 5, 9, 11, 13, 15, 20, 23, 34.

   • Arbreton's scale is on p.8, items 13, 15, 17, 19, 20

4. Executive Help-Seeking scale is on pp. 2–3, items 6, 8, 12, 14, 16, 21, 26, 29, 31, 33.

   • Arbreton's scale is on p.8, items 14, 16, 18

5. Avoidance of Help-Seeking scale is on pp. 2–3, items 2, 4, 7, 10, 18, 22, 25, 28, 30.

6. Perceived Benefits of Help-Seeking scale: pp. 2–3, items 17, 19, 24, 27, 32, 35, 36.

7. Computer Science Self-Concept scale is on p. 1, items 10–18.

8. Computer Science Anxiety scale is on p. 7, items 1–9.

9. Achievement Goal Orientation scale is on p. 6, items 1–16.

10. Self-efficacy for Self-Regulated Learning scale is on the bottom of p. 4, items 1–7.

11. Value of Computer Science scale is on p. 1 items 1, 3, 4, 6, 7, 8 and p. 7 items 13–15.

Name _____

Gender: *Male*   *Female*

Race/Ethnicity: *White*   *African American*   *Asian American*
                        Hispanic American   *Native American*   *Other*

Grade Level: _____   **Age:** _____   **Computer Science Teacher:** _____
                                           Course Title: _____

Directions: Please use the following scale to answer the following statements. Circle the number that best describes how true or false each statement is for you.

```
1         2         3         4         5         6         7         8
|_____|_____|_____|_____|_____|_____|_____|
```
Completely   **Completely**
False   **True**

1	It is important to me to get good grades in computer science.	1 2 3 4 5 6 7 8
2	I am better at computer science than the boys in my class.	1 2 3 4 5 6 7 8
3	I enjoy doing computer science work.	1 2 3 4 5 6 7 8
4	Being good in computer science is important to me.	1 2 3 4 5 6 7 8
5	I am better at computer science than the girls in my class.	1 2 3 4 5 6 7 8
6	Computer science is interesting for me.	1 2 3 4 5 6 7 8
7	Computer science is boring.	1 2 3 4 5 6 7 8
8	Computer science is a lot of fun.	1 2 3 4 5 6 7 8
9	I am better at computer science than *all* students in my class.	1 2 3 4 5 6 7 8
10	Computer science makes me feel inadequate.	1 2 3 4 5 6 7 8
11	I find computer science interesting and challenging.	1 2 3 4 5 6 7 8
12	I am quite good at computer science.	1 2 3 4 5 6 7 8
13	I have never been very excited about computer science.	1 2 3 4 5 6 7 8
14	My friends come to me for help with computer science	1 2 3 4 5 6 7 8
15	I never do well on assignments that require programming.	1 2 3 4 5 6 7 8
16	I have trouble understanding anything related to computer science.	1 2 3 4 5 6 7 8
17	Learning how to program is easy for me.	1 2 3 4 5 6 7 8
18	I have always done well on assignments that require programming.	1 2 3 4 5 6 7 8

Directions: As you answer the following questions, please keep in mind that we are interested in *your experience only in computer science class.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Completely
False

Completely
True

1	When I ask my computer science teacher for help, I prefer to be given hints or clues rather than the answer.	1 2 3 4 5 6 7 8
2	I don't ask for help in this class, even when the work is too hard to solve on my own.	1 2 3 4 5 6 7 8
3	When I am having trouble and ask the computer science teacher for help, I like to be given examples of similar problems we have done.	1 2 3 4 5 6 7 8
4	If I need help to do a computer science problem, I prefer to skip it rather than to ask for help.	1 2 3 4 5 6 7 8
5	When I ask a student for help with my computer science work, I don't want that student to give away the whole answer.	1 2 3 4 5 6 7 8
6	When I ask the teacher for help in this class, I prefer that the teacher do the work for me rather than explain to me how to do it.	1 2 3 4 5 6 7 8
7	I don't ask for help in this class, even if I don't understand the lesson.	1 2 3 4 5 6 7 8
8	When I ask a student for help on something I don't understand, I prefer that student to just give me the answer rather than to explain it.	1 2 3 4 5 6 7 8
9	When I ask a student for help understanding the material in this class, I prefer that the student help me understand the general ideas rather than simply tell me the answer.	1 2 3 4 5 6 7 8
10	If I didn't understand something in this class, I would guess rather than ask someone for help.	1 2 3 4 5 6 7 8
11	When I ask the teacher for help with something I don't understand, I ask the teacher to explain it to me rather than just give me the answer.	1 2 3 4 5 6 7 8
12	When I ask a student for help with my work, I prefer that the student do the work for me rather than explain to me how to do it.	1 2 3 4 5 6 7 8
13	When I ask a student for help in this class, I want to be helped to complete the work myself rather than have the work done for me.	1 2 3 4 5 6 7 8
14	When I ask my teacher for help on something I don't understand, I prefer that the teacher do it for me.	1 2 3 4 5 6 7 8
15	When I ask my teacher for help in this class, I only want as much help as necessary to complete the work myself.	1 2 3 4 5 6 7 8
16	When I ask another student for help on something I don't understand, I ask that student to do it for me.	1 2 3 4 5 6 7 8
17	I like to ask questions in this class.	1 2 3 4 5 6 7 8

Directions: As you continue to answer the following questions, please keep in mind that we are interested in *your experience only in computer science class*.

```
1        2        3        4        5        6        7        8
Completely                                            Completely
False                                                 True
```

18	I would rather do worse on an assignment I couldn't finish than ask for help in this class.	1 2 3 4 5 6 7 8
19	I feel smart when I ask a question in this class.	1 2 3 4 5 6 7 8
20	When I ask a student for help in this class, I prefer to be given hints or clues rather than the answer.	1 2 3 4 5 6 7 8
21	When I ask a student for help in this class, I want the work done for me rather than be helped to complete the work myself.	1 2 3 4 5 6 7 8
22	Even if the work was too hard to do on my own, I wouldn't ask for help in this class.	1 2 3 4 5 6 7 8
23	When I ask a student for help with something I don't understand, I ask the student to explain it to me rather than just give me the answer.	1 2 3 4 5 6 7 8
24	Asking questions makes this class more interesting for me.	1 2 3 4 5 6 7 8
25	I would put down any answer rather than ask for help in this class.	1 2 3 4 5 6 7 8
26	When I ask a student for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.	1 2 3 4 5 6 7 8
27	I like to ask for help in this class because it helps me understand computer science better.	1 2 3 4 5 6 7 8
28	I don't ask questions in this class, even if I don't understand the lesson.	1 2 3 4 5 6 7 8
29	When I ask my teacher for help on something I don't understand, I prefer the teacher to just give me the answer rather than to explain it.	1 2 3 4 5 6 7 8
30	If work in this class is too hard, I don't do it rather than ask for help.	1 2 3 4 5 6 7 8
31	When I ask the teacher for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.	1 2 3 4 5 6 7 8
32	I think asking questions in this class helps me learn.	1 2 3 4 5 6 7 8
33	When I ask my teacher for help, I want the teacher to do the work for me rather than help me be able to complete the work myself.	1 2 3 4 5 6 7 8
34	When I ask my teacher for help understanding the material in this class, I prefer that the teacher help me understand the general ideas rather than simply tell me the answer.	1 2 3 4 5 6 7 8
35	I enjoy this class more when I ask questions.	1 2 3 4 5 6 7 8
36	I like to ask for help in this class because it helps me understand the topic more completely.	1 2 3 4 5 6 7 8

Directions: Using the scale from 1 (*not confident at all*) to 8 (*completely confident*), please answer the questions below.
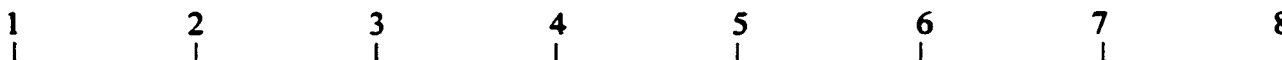
1	2	3	4	5	6	7	8

Not confident at all   **Completely Confident**

1	Using the scale above, *how confident are you* that you will **pass computer science class** *at the end of this term?*	1 2 3 4 5 6 7 8
2	*How confident are you* that you will pass computer science at the end of this term with **a grade better than a D?**	1 2 3 4 5 6 7 8
3	*How confident are you* that you will get **a grade better than a C?**	1 2 3 4 5 6 7 8
4	*How confident are you* that you will get **a grade better than a B?**	1 2 3 4 5 6 7 8
5	*How confident are you that you will get* **an A?**	1 2 3 4 5 6 7 8

Directions: Read each statement below very carefully and use the following scale to answer as honestly as you can. Remember that *you can circle any number from 1 to 8.*

1	2	3	4	5	6	7	8

Not well at all   **Very well**

1	How well can you *finish your computer science homework* on time?	1 2 3 4 5 6 7 8
2	How well can you *study computer science when there are other interesting things to do?*	1 2 3 4 5 6 7 8
3	How well can you *concentrate on your computer science school work?*	1 2 3 4 5 6 7 8
4	How well can you *remember information* presented in computer science class and in your computer science books?	1 2 3 4 5 6 7 8
5	How well can you *arrange a place to study computer science at home* where you won't get distracted?	1 2 3 4 5 6 7 8
6	How well can you *motivate yourself* to do computer science schoolwork?	1 2 3 4 5 6 7 8
7	How well can you participate in *computer science class discussions?*	1 2 3 4 5 6 7 8

Directions: Below you will find another set of statements. *Remember that there are no right or wrong answers to these statements. How true or false is each statement for you?*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Completely
False

Completely
True

1	I am a gentle person.	1 2 3 4 5 6 7 8
2	I am good at understanding other people's problems.	1 2 3 4 5 6 7 8
3	When someone's feelings get hurt, I try to make them feel better.	1 2 3 4 5 6 7 8
4	I can usually tell when someone needs help.	1 2 3 4 5 6 7 8
5	I am a kind and caring person.	1 2 3 4 5 6 7 8
6	I like to do things that boys and men like to do.	1 2 3 4 5 6 7 8
7	I am willing to take risks.	1 2 3 4 5 6 7 8
8	I am a warm person and express these feelings to those I feel close to.	1 2 3 4 5 6 7 8
9	I am an active, adventurous person.	1 2 3 4 5 6 7 8
10	I like to figure out how mechanical things work.	1 2 3 4 5 6 7 8
11	I care about other people's feelings.	1 2 3 4 5 6 7 8
12	I like activities where it is one person or group against another.	1 2 3 4 5 6 7 8
13	I like building and fixing things.	1 2 3 4 5 6 7 8
14	I like to compete with others.	1 2 3 4 5 6 7 8
15	I like to do things that girls and women like to do.	1 2 3 4 5 6 7 8
16	I like to show that I can do things better than others my age.	1 2 3 4 5 6 7 8
17	If I have a problem, I like to work it out alone.	1 2 3 4 5 6 7 8
18	I like babies and small children a lot.	1 2 3 4 5 6 7 8
19	I enjoy science and math.	1 2 3 4 5 6 7 8
20	I care about what happens to others.	1 2 3 4 5 6 7 8

Directions: Here is another set of statements. *Remember that there are no right or wrong answers to these statements. How true or false is each statement for you?*

```
   1         2         3         4         5         6         7         8
   |_____|_____|_____|_____|_____|_____|_____|
```

Completely
False

Completely
True

1	The reason I do computer science assignments is so the teacher won't think I know less than other students.	1 2 3 4 5 6 7 8
2	I want to do better than other students in my computer science class.	1 2 3 4 5 6 7 8
3	I like computer science assignments I can learn from, even if I make a lot of mistakes.	1 2 3 4 5 6 7 8
4	I do my computer science assignments so others in the class won't think I'm dumb.	1 2 3 4 5 6 7 8
5	I would feel successful at computer science if I did better than most of the other students in the class.	1 2 3 4 5 6 7 8
6	An important reason I do my computer science assignments is because I like to learn new things.	1 2 3 4 5 6 7 8
7	One reason I might not participate in computer science class is to avoid looking stupid.	1 2 3 4 5 6 7 8
8	I would feel really good if I were the only student in class who could answer the teacher's questions about computer science.	1 2 3 4 5 6 7 8
9	I like computer science assignments that really make me think.	1 2 3 4 5 6 7 8
10	One of my main goals in computer science class is to avoid looking like I can't do my work.	1 2 3 4 5 6 7 8
11	I'd like to show my computer science teacher that I'm smarter than the other students in my computer science class.	1 2 3 4 5 6 7 8
12	An important reason I do my computer science assignments is because I want to become better at computer science.	1 2 3 4 5 6 7 8
13	It's important to me that I don't look stupid in computer science class.	1 2 3 4 5 6 7 8
14	Doing better than other students in computer science is important to me.	1 2 3 4 5 6 7 8
15	I do my computer science assignments because I am interested in them.	1 2 3 4 5 6 7 8
16	An important reason I do my computer science assignments is so I won't embarrass myself.	1 2 3 4 5 6 7 8

Directions: One more time. *Remember that there are no right or wrong answers to these statements. How true or false is each statement for you?*

```
1        2        3        4        5        6        7        8
├────────┼────────┼────────┼────────┼────────┼────────┼────────┤
```

Completely   *Completely*
False   **True**

1	Taking computer science tests does not scare me.	1 2 3 4 5 6 7 8
2	Computer science makes me feel uneasy and confused.	1 2 3 4 5 6 7 8
3	I worry about my ability to complete computer science assignments.	1 2 3 4 5 6 7 8
4	I get really uptight during computer science tests or projects.	1 2 3 4 5 6 7 8
5	I get a sinking feeling when I think of trying hard computer science assignments.	1 2 3 4 5 6 7 8
6	My mind goes blank and I am unable to think clearly when doing computer science.	1 2 3 4 5 6 7 8
7	Computer science makes me feel uncomfortable and nervous.	1 2 3 4 5 6 7 8
8	I am afraid of doing computer science assignments when I know they will be graded.	1 2 3 4 5 6 7 8
9	Just thinking about computer science makes me feel nervous.	1 2 3 4 5 6 7 8
10	I would ask for more help if there were *fewer girls* in this class.	1 2 3 4 5 6 7 8
11	I would ask for more help if there were *fewer boys* in this class.	1 2 3 4 5 6 7 8
12	When a computer science assignment is difficult for me to solve, I just put more effort into it.	1 2 3 4 5 6 7 8
13	I like to do computer science work.	1 2 3 4 5 6 7 8
14	I look forward to computer science class.	1 2 3 4 5 6 7 8
15	I like completing computer science assignments.	1 2 3 4 5 6 7 8
16	When I find computer science homework difficult, I usually just give up on it.	1 2 3 4 5 6 7 8
17	When I come across a tough computer science assignment, I work on it until I complete it.	1 2 3 4 5 6 7 8
18	I would ask for more help if there were *more boys* in this class.	1 2 3 4 5 6 7 8
19	I would ask for more help if there were *more girls* in this class.	1 2 3 4 5 6 7 8

Directions: Here is the last set of statements. Please use the following scale to answer them. Circle the number that best describes how true or false each statement is for you.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Completely False   **Completely True**

1	When I'm not sure what is going to happen, I usually expect that the best possible thing will happen.	1 2 3 4 5 6 7 8
2	If something can go wrong for me, it will.	1 2 3 4 5 6 7 8
3	I always look on the bright side of things.	1 2 3 4 5 6 7 8
4	I hardly ever expect things to go my way.	1 2 3 4 5 6 7 8
5	I'm always optimistic about my future.	1 2 3 4 5 6 7 8
6	Things never work out the way I want them to.	1 2 3 4 5 6 7 8
7	I feel confident that I will succeed in the future.	1 2 3 4 5 6 7 8
8	Good things never happen to me.	1 2 3 4 5 6 7 8
9	Most things in life have a happy ending.	1 2 3 4 5 6 7 8
10	When I'm not sure what is going to happen, I usually expect that the worst possible thing will happen.	1 2 3 4 5 6 7 8
11	Things usually work out the way I want them to.	1 2 3 4 5 6 7 8
12	If something *can* go wrong for me, it *will* go wrong.	1 2 3 4 5 6 7 8
13	If I need help in computer science, I ask my teacher to give me hints or clues rather than the answer.	1 2 3 4 5 6 7 8
14	I often ask the teacher for help in computer science before I try the work on my own.	1 2 3 4 5 6 7 8
15	If I need help with my computer science work, I ask questions so the teacher will not give away the whole answer.	1 2 3 4 5 6 7 8
16	If I don't understand something in computer science, the first thing I do is ask the teacher to give me the answer.	1 2 3 4 5 6 7 8
17	If I have trouble doing a computer science problem, I ask my teacher to give me examples of similar problems we have done.	1 2 3 4 5 6 7 8
18	I get the teacher to help me with my computer science work so that I can finish quickly.	1 2 3 4 5 6 7 8
19	Before I ask for help with my computer science work, I think about what kinds of questions to ask.	1 2 3 4 5 6 7 8
20	If I get stuck on a difficult computer science problem, I ask the teacher for help so that I can keep working on it.	1 2 3 4 5 6 7 8

There are just a few more things we would like to know.
Please circle the appropriate response to each of the questions below.

Do you have *use of a computer* at home?   Yes   No

    If you use a computer at home, what type of computer is it?   Mac   PC

Do you have a computer *of your own* at home?   Yes   No

What type of computer do you use in your computer science class at school?   Mac   PC

What grade did you receive in Computer Science class last term?

A   A-   B+   B   B-   C+   C   C-   D+   D   D-   F

On average, how much time *each weekday* (Monday-Friday) do you spend on a computer?

| Less than 30 minutes | 30 minutes to 1 hour | 1 hour to 90 minutes | 90 minutes to 2 hours | 2 to 3 hours | more than 3 hours |

On average, how much time *each weekend day* (Saturday-Sunday) do you spend on a computer?

| Less than 30 minutes | 30 minutes to 1 hour | 1 hour to 90 minutes | 90 minutes to 2 hours | 2 to 3 hours | more than 3 hours |

Outside of computer science classes at school, how much experience have you had *with programming*?

none   very little   some   a good deal   a lot

Thank you very much for helping us with this research. We appreciate the time you've taken to complete our survey. Please take a moment to check each page and be sure you've completed each item.

APPENDIX B
ITEMS CORRESPONDING TO SCALES USED IN THE STUDY

Instrumental Help-Seeking

INST1. When I ask my computer science teacher for help, I prefer to be given hints or clues rather than the answer.

INST2. When I am having trouble and ask the computer science teacher for help, I like to be given examples of similar problems we have done.

INST3. When I ask the teacher for help with something I don't understand, I ask the teacher to explain it to me rather than just give me the answer.

INST4. When I ask my teacher for help in this class, I only want as much help as necessary to complete the work myself.

INST5. When I ask my teacher for help understanding the material in this class, I prefer that the teacher help me understand the general ideas rather than simply tell me the answer.

INST6. When I ask a student for help with my computer science work, I don't want that student to give away the whole answer.

INST7. When I ask a student for help understanding the material in this class, I prefer that the student help me understand the general ideas rather than simply tell me the answer.

INST8. When I ask a student for help in this class, I want to be helped to complete the work myself rather than have the work done for me.

INST9. When I ask a student for help in this class, I prefer to be given hints or clues rather than the answer.

INST10. When I ask a student for help with something I don't understand, I ask the student to explain it to me rather than just give me the answer.

Executive Help-Seeking

EXEC1. When I ask the teacher for help in this class, I prefer that the teacher do the work for me rather than explain to me how to do it.

EXEC2. When I ask my teacher for help on something I don't understand, I prefer that the teacher do it for me.

EXEC3. When I ask my teacher for help on something I don't understand, I prefer the teacher to just give me the answer rather than to explain it.

EXEC4. When I ask the teacher for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.

EXEC5. When I ask my teacher for help, I want the teacher to do the work for me rather than help me be able to complete the work myself.

EXEC6. When I ask a student for help on something I don't understand, I prefer that student to just give me the answer rather than to explain it.

EXEC7. When I ask a student for help with my work, I prefer that the student do the work for me rather than explain to me how to do it.

EXEC8. When I ask another student for help on something I don't understand, I ask that student to do it for me.

EXEC9. When I ask a student for help in this class, I want the work done for me rather than be helped to complete the work myself.

EXEC10. When I ask a student for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.

Avoidance of Help-Seeking

HAV1. I don't ask for help in this class, even when the work is too hard to solve on my own.

HAV2. If I need help to do a computer science problem, I prefer to skip it rather than to ask for help.

HAV3. I don't ask for help in this class, even if I don't understand the lesson.

HAV4. If I didn't understand something in this class, I would guess rather than ask someone for help.

HAV5. I would rather do worse on an assignment I couldn't finish than ask for help in this class.

HAV6. Even if the work was too hard to do on my own, I wouldn't ask for help in this class.

HAV7. I would put down any answer rather than ask for help in this class.

HAV8. I don't ask questions in this class, even if I don't understand the lesson.

HAV9. If work in this class is too hard, I don't do it rather than ask for help.

Perceived Benefits of Help-Seeking

HBEN1. I like to ask questions in this class.

HBEN2. I feel smart when I ask a question in this class.

HBEN3. Asking questions makes this class more interesting for me.

HBEN4. I like to ask for help in this class because it helps me understand computer science better.

HBEN5. I think asking questions in this class helps me learn.

HBEN6. I enjoy this class more when I ask questions.

HBEN7. I like to ask for help in this class because it helps me understand the topic more completely.

Arbreton's Instrumental Help-Seeking Scale

1. If I need help in computer science, I ask my teacher to give me hints or clues rather than the answer.

2. If I need help with my computer science work, I ask questions so the teacher will not give away the whole answer.

3. If I have trouble doing a computer science problem, I ask my teacher to give me examples of similar problems we have done.

4. Before I ask for help with my computer science work, I think about what kinds of questions to ask.

5. If I get stuck on a difficult computer science problem, I ask the teacher for help so that I can keep working on it.

Arbreton's Executive Help-Seeking Scale

1. I often ask the teacher for help in computer science before I try the work on my own.

2. If I don't understand something in computer science, the first thing I do is ask the teacher to give me the answer.

3. I get the teacher to help me with my computer science work so that I can finish quickly.

Computer Science Grade Self-Efficacy

1. Using the scale above, *how confident are you* that you will **pass computer science class** *at the end of this term?*
2. *How confident are you* that you will pass computer science at the end of this term with **a grade better than a D?**
3. *How confident are you* that you will get **a grade better than a C?**
4. *How confident are you* that you will get **a grade better than a B?**
5. *How confident are you that you will get* **an A?**

Computer Science Self-Concept

1. Computer science makes me feel inadequate.
2. I find computer science interesting and challenging.
3. I am quite good at computer science.
4. I have never been very excited about computer science.
5. My friends come to me for help with computer science
6. I never do well on assignments that require programming.
7. I have trouble understanding anything related to computer science.
8. Learning how to program is easy for me.
9. I have always done well on assignments that require programming.

Computer Science Anxiety

1. Taking computer science tests does not scare me.
2. Computer science makes me feel uneasy and confused.
3. I worry about my ability to complete computer science assignments.
4. I get really uptight during computer science tests or projects.
5. I get a sinking feeling when I think of trying hard computer science assignments.
6. My mind goes blank and I am unable to think clearly when doing computer science.
7. Computer science makes me feel uncomfortable and nervous.
8. I am afraid of doing computer science assignments when I know they will be graded.
9. Just thinking about computer science makes me feel nervous.

Self-Efficacy for Self-Regulated Learning

1. How well can you *finish your computer science homework* on time?
2. How well can you *study computer science when there are other interesting things to do?*
3. How well can you *concentrate on your computer science school work?*
4. How well can you *remember information* presented in computer science class and in your computer science books?
5. How well can you *arrange a place to study computer science at home* where you won't get distracted?
6. How well can you *motivate yourself* to do computer science schoolwork?
7. How well can you participate in *computer science class discussions?*

Value of Computer Science

1. It is important to me to get good grades in computer science.
2. I enjoy doing computer science work.
3. Being good in computer science is important to me.
4. Computer science is interesting for me.
5. Computer science is boring.
6. Computer science is a lot of fun.
7. I like to do computer science work.
8. I look forward to computer science class.
9. I like completing computer science assignments.

Achievement Goal Orientation

Task Goals

1. I like computer science assignments I can learn from, even if I make a lot of mistakes.
2. An important reason I do my computer science assignments is because I like to learn new things.
3. I like computer science assignments that really make me think.
4. An important reason I do my computer science assignments is because I want to become better at computer science.
5. I do my computer science assignments because I am interested in them..

Performance-Approach Goals

1. I want to do better than other students in my computer science class.
2. I would feel successful at computer science if I did better than most of the other students in the class.
3. I would feel really good if I were the only student in class who could answer the teacher's questions about computer science.
4. I'd like to show my computer science teacher that I'm smarter than the other students in my computer science class.
5. Doing better than other students in computer science is important to me.

Performance-Avoid Goals

1. The reason I do computer science assignments is so the teacher won't think I know less than other students.
2. I do my computer science assignments so others in the class won't think I'm dumb.
3. One reason I might not participate in computer science class is to avoid looking stupid.
4. One of my main goals in computer science class is to avoid looking like I can't do my work.
5. It's important to me that I don't look stupid in computer science class.
6. An important reason I do my computer science assignments is so I won't embarrass myself.

Gender Orientation, Masculinity Items

1. I like to do things that boys and men like to do.
2. I am willing to take risks.
3. I am an active, adventurous person.
4. I like to figure out how mechanical things work.
5. I like activities where it is one person or group against another.
6. I like building and fixing things.
7. I like to compete with others.
8. I like to show that I can do things better than others my age.
9. If I have a problem, I like to work it out alone.
10. I enjoy science and math.

Gender Orientation, Femininity Items

1. I am a gentle person.
2. I am good at understanding other people's problems.
3. When someone's feelings get hurt, I try to make them feel better.
4. I can usually tell when someone needs help.
5. I am a kind and caring person.
6. I am a warm person and express these feelings to those I feel close to.
7. I care about other people's feelings.
8. I like to do things that girls and women like to do.
9. I like babies and small children a lot.
10. I care about what happens to others.

APPENDIX C
PERMISSION TO CONDUCT RESEARCH IN SCHOOLS

RESEARCH PROTOCOL FOR OBTAINING INFORMED CONSENT FROM PARENTS, LEGAL GUARDIANS, AND CHILDREN

You are invited to participate in this research study. The following information is provided in order to help you make an informed decision whether or not to participate. If you have any questions about any aspect of this study, or the information on this form, please do not hesitate to ask. You are eligible to participate because you are a student in a programming class at School X. The purpose of this study is to investigate interactions in a computer science classroom. Participation in this study will require one survey of approximately 30 minutes and is not considered part of the course. Your teacher will also be asked for his/her judgment of your progress in computer science. Participation or non-participation will not affect the evaluation of your performance in this class. There are no known risks or discomforts associated with this study.

You may experience no direct benefits from this survey, or you may find the experience enjoyable and the information may be helpful to you in better understanding your interactions with fellow students. The information gained from this study may also help me better understand the factors that influence student interaction in the computer science classroom.

Your participation is *voluntary*. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the researcher or with School X. You may also skip questions without needing to supply any explanation. Your decision will not result in any loss of benefits to which you are otherwise entitled. If you choose to participate, you may withdraw at any time by notifying Paul Oberman in person, at poberma@emory.edu, or at (404) 251-4330. Upon your decision to withdraw, all information pertaining to you will be destroyed. If you choose to participate, all information will be held in strict confidence and will have no bearing on your academic standing or services you receive from School X. The information obtained in this study may be published in scientific journals or presented at scientific meetings, but your identity will be kept strictly confidential.

If you are willing to participate in this study, please sign the statement below, have a parent sign the statement, and return it to Mr. Paul Oberman. Keep the extra unsigned copy. If you choose not to participate, you may retain both copies of the agreement. Thank you for considering participating in this study.

Project Director: Paul Oberman, Ph.D. candidate at Emory University
               Atlanta, GA, Telephone (404) 251-4330
       Dissertation Adviser: Dr. Frank Pajares, (404) 727-1775

       If you have any questions about your rights as a participant in this study, please contact the Chair of Emory University's Social, Humanist, and Behavioral Institutional Review Board: Dr. Karen Hegtvedt, (404) 727-7517

I have read and understand the information on the form and I consent to volunteer to be a participant in this study. I understand that I have the right to withdraw at any time. I have received an unsigned copy of this Informed Consent Form to keep in my possession.

Name (PLEASE PRINT) _____

Signature _____

Signature of Parent or Legal Guardian _____

Paul S. Oberman
Educational Studies
N. Decatur Bldg., Suite 240

RE: **NOTIFICATION OF PROTOCOL APPROVAL**
PI: Paul S. Oberman
IRB ID: **690-2001**
TITLE: Academic Help-seeking in the high school computer science classroom: Relationship to motivation, gender and gender orientation
DATE: October 08, 2001

THIS PROTOCOL WAS REVIEWED   9/20/2001
Review Type: Full
This approval is valid from 10/5/2001 until 10/4/2002.

Your research proposal referenced above and the associated informed consent process was reviewed and APPROVED by the Social, Humanist and Behavioral Institutional Review Board.

Your approval period is noted above. Thereafter, continued approval is contingent upon the submission of a renewal form that must be reviewed and approved by the Institutional Review Board prior to the anniversary or expiration date of this study. Any serious reactions resulting from this study should be reported immediately to the Committee, to the Departmental Chairperson, and to any sponsoring agency or company. Approval is granted based upon your agreement to abide by the policies and procedures of Emory University with regard to use of human subjects in research and to keep appropriate records concerning your subjects.

Failure to receive a notification that it is time to renew does not relieve you of your responsibility to provide the IRB with a 'Request for Renewal' in time for the request to be processed and approved before your expiration date.

Projects which are being submitted to agencies or other sponsors for external funding must also be approved through the Office of Sponsored Programs prior to initiation of the study.

Please note that this protocol has been assigned the above referenced IRB protocol number. All inquires and correspondence concerning this protocol must include: 1) The above referenced IRB number, 2) Name of the Principal Investigator, and 3) Full Title of Study. Please reference this number when making inquiries regarding this protocol and when submitting grant application material to the Office of Sponsored Programs.

If you have any questions or concerns, please contact the IRB office at 404-727-5646 or at email address irb@emory.edu.

Sincerely,

Karen P. Hegtvedt

Karen Hegtvedt, PhD
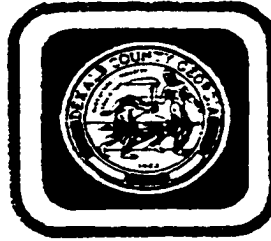Chair, Institutional Review Board (IRB)
Assurance number - M1346
cc: Frank Pajares, Bob Jensen

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October 5, 2001

Mr. Paul Oberman
P.O. Box 22928
Atlanta, GA 30322

Reference: *Academic Help-Seeking in the High School Computer Science Classroom: Relationship to Motivation, Gender, and Gender Orientation* to be conducted at Tucker High School, Chamblee High School, Lakeside High School, Dunwoody High School and Towers High School.

Dear Mr. Oberman:

This letter is to advise you that your research proposal *Academic Help-Seeking in the High School Computer Science Classroom: Relationship to Motivation, Gender, and Gender Orientation* (File Number 2001-0017) has been approved with Tucker High School, Chamblee High School, Lakeside High School, Dunwoody High School and Towers High School as the sites.

Please forward a copy of your results to me when they are completed. Also, would you please provide us with some feedback on the research approval process by completing the enclosed survey and returning it in the enclosed postage paid envelope.

Best wishes for a successful research project. Please call me at 404.508.2611 if I may be of further assistance.

Sincerely,

Steve Pemberton, Ed.D., Coordinator
The Department of Research and Evaluation

Enclosures

Cc: Robert Moseley, Principal, Tucker High School
     Dianne Clark, Principal, Chamblee High School
     Randy Lee, Principal, Lakeside High School
     Joanne Leonard, Principal, Dunwoody High School
     Leroy Jenkins, Principal, Towers High School

Oberman

THE SCHOOL CANNOT LIVE APART FROM THE COMMUNITY