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Investigating social-desirability bias in self-reporting on motivational attitudes by adult students

Larisa Revzina

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The University of San Francisco

INVESTIGATING SOCIAL-DESIRABILITY BIAS
IN SELF-REPORTING ON MOTIVATIONAL
ATTITUDES BY ADULT STUDENTS

A Dissertation Presented to
the Faculty of the School of Education
Learning and Instruction Department

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Larisa Revzina
San Francisco, CA
May 2008

This dissertation, written under the direction of the candidate's dissertation committee and approved by the members of the committee, has been presented to and accepted by the Faculty of the School of Education in partial fulfillment of the requirements for the degree of Doctor of Education. The content and research methodologies presented in this work represent the work of the candidate alone.

Larisa Revzina

Dissertation Committee

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TABLE OF CONTENTS

	Page
TABLE OF CONTENTS.....	ii
LIST OF TABLES.....	v
CHAPTER.....	1
I. INTRODUCTION.....	1
Statement of the Problem.....	1
Purpose.....	2
Background and Need.....	3
Research Questions.....	4
Theoretical Rationale.....	4
Social-Desirability Bias.....	5
Adult Learner Motivation.....	6
Significance of Study.....	7
Definition of Terms.....	7
Summary.....	11
II. REVIEW OF LITERATURE.....	12
Social-Desirability Bias.....	12
Reducing Social-Desirability Bias.....	18
Reducing Social-Desirability Bias Through Use of Indirect Questions.....	22
Motivational Theories and Conceptual Frameworks.....	34
Motivation Measurement.....	35

TABLE OF CONTENTS CONTINUED

	Page
Academic Motivation Scale.....	44
Social-Desirability Measurement.....	47
Marlowe-Crowne Social-Desirability Scale.....	47
Balanced Inventory of Desirable Responding (BIDR).....	49
Summary.....	55
III. METHODOLOGY.....	57
Research Design.....	57
Setting.....	58
Sample.....	59
Protection of Human Subjects.....	59
Research Instrument.....	60
Data Collection.....	63
Data Analysis.....	65
IV. RESULTS.....	67
Overall Results.....	67
Order of Two Versions of AMS Taken.....	70
Social-Desirability Bias In Two Versions of AMS.....	72
AMS Motivational Scales' Social-Desirability Bias.....	76
Differences in Responses on AMS.....	76
Summary.....	78
V. DISCUSSION, IMPLICATIONS, AND CONCLUSIONS.....	80

TABLE OF CONTENTS CONTINUED

	Page
Summary.....	80
Limitations.....	82
Discussion.....	83
Order of Two Versions of AMS Taken.....	83
Social-Desirability Bias In Two Versions of AMS.....	84
AMS Motivational Scales' Social-Desirability Bias.....	85
Differences in Responses on AMS.....	85
Implications for Practice.....	86
Suggestions for Future Research.....	87
Conclusions.....	88
REFERENCES.....	90
APPENDICES.....	95
Appendix A.....	95
Appendix B.....	97

LIST OF TABLES

Table	Page
1. Means, Standard Deviations, Sample Sizes and t-test Comparisons of Order for Direct Questionnaire	69
2. Means, Standard Deviations, Sample Sizes and t-test Comparisons of Order for Indirect Questionnaire.....	70
3. Pearson Product-Moment Correlation Coefficients for Difference in Direct and Indirect AMS Scales	73
4. Pearson Product-Moment Correlation Coefficients for BIDR Scales	73
5. Means, Standard Deviations, t-test Results, df, and Practical Importance of Direct-Indirect AMS Motivational Scales.....	77

CHAPTER I

INTRODUCTION

Statement of the Problem

Participation in adult education has grown steadily since 1970s (Creighton & Hudson, 2002). Adults are the fastest growing population in institutions of higher learning (Benshoff & Lewis, 1992) and 92 million people – 46% of the entire U.S. adult population – has participated in some form of adult education in 2001 (Stokes, 2005). The motivational source that voluntarily drives such a formidable group of adults back into classrooms is one of the key areas of research into adult learning (Misch, 2002) as major adult learning theories (Knowles, 1968) posited that tailoring adult education to account for adult students' source of motivation to learn will improve the overall learning experience and learning outcomes. Children are compelled by law to attend school up to a certain age in many countries throughout the world - a fact that easily accounts for the many millions of children found in classrooms - whereas adults are not required to receive any formal education (Miller, Malley, & Owen, 2007); yet as the evidence above bears out, many millions of adults seek out learning in formalized settings.

Although numerous studies have been conducted to identify and measure adult sources of educational motivation (e.g., Pang & Schultheiss, 2005; Urdan & Schoenfelder, 2006), much of what is known about individual behaviors (including motivation) is based on self-reports obtained through either interviewer- or self-administered questionnaires (Petersen & Kerin, 1981). Unfortunately, self-reports are a fallible source of data because of their potential susceptibility to social-desirability response bias (Fisher, 1993). Respondents are often unwilling or unable to report accurately on sensitive topics for ego-defensive or impression management reasons. The

result is data that are biased systematically toward respondents' perceptions of what is "correct" or socially acceptable (Fisher, 1993). To date, no research has been done to understand, measure, or minimize the social-desirability bias in motivational attitudes self-report questionnaires. Ultimately, this means that to date educational research may not have a full understanding of sources for adult-learning motivation.

Purpose

The purpose of this research was to assess the social-desirability bias in a modified version of a widely used and widely accepted motivational self-reporting tool: Academic Motivation Scale (Vallerand et al., 1992). Because respondents often hide their true attitudes - in order to impress the researcher or interviewer or to preserve one's self-esteem - measuring the effects of social-desirability bias is crucial to understanding which particular areas of academic motivation students are the most likely to misrepresent.

The attempt to assess the bias was accomplished by administering two versions of the Academic Motivation Scale (AMS): one that contains questions pertaining to the student himself or herself ("direct-questioning") and one that contains the same questions yet pertains to *all* students in the class ("indirect-questioning"). The AMS is designed to measure the level of intrinsic motivation, extrinsic motivation, and amotivation. The students completed both versions of the questionnaire. With respondents thinking about adult students in general terms and not about themselves specifically while answering indirect questions, the effects of social-desirability bias was lessened as the respondents projected their true attitudes when answering questions about a general adult learner (Fisher, 1993). Additionally, research study participants filled out the Balanced

Inventory of Desirable Responding Questionnaire (BIDR) – an instrument designed to measure two separate dimensions of social-desirability bias: “self-deceptive enhancement” and “impression management” (Ferrari, Bristow, & Cowman, 2005). The measures collected from the surveys were compared with one another in order to assess the effect of social-desirability on motivation attitudes self-reporting in adult learners.

Background and Need

Higher education is a bridge to a career in the current and future global economy for vast numbers of working adults, and lifelong learning is a necessary component in retaining a position within this economic environment. Comings, Sum, and Uvin (2000) noted while at one time mastering a set of mechanical skills could ensure a lifetime of employment and perhaps even a place for a son or daughter within the same workplace that possibility has become increasingly rare in a world marked by complexity, competitiveness, and market change. Consequently, a single set of skills in 21st-century dynamic economy is no longer sufficient. Workers must be prepared for a variety of jobs, workplaces, and even careers. The U.S. Department of Labor data indicate that 90% of the fastest growing jobs require some form of postsecondary education (Comings et. al., 2000). In this respect, the focus on adult learners is integral to sustaining the health of the U.S. higher education economy (Stokes, 2005).

Accordingly, understanding what makes adult learners attain their educational goals and what motivates them is an integral part of ensuring the future growth of the economy and the success of United States citizens. Although identifying and measuring the effects of social-desirability bias is the main focus of this study, the ultimate

significance will be to garner an improved understanding of what motivates an adult student to learn, using an instrument that does not assess social desirability bias.

Research Questions

The questions this study was seeking to answer are as follows:

1. To what extent was there an order effect in the presentation of the two versions of the AMS?
2. To what extent was there social-desirability bias on each of the two versions of the AMS?
3. Which aspect of motivation had the most social desirability bias: the three levels of intrinsic motivation, extrinsic motivation, or amotivation? Which aspect had the least?
4. To what extent is there a difference in the social-desirability bias for the two versions of the AMS?

Theoretical Rationale

There are two theoretical frameworks that meet within the present investigation. One of the theoretical frameworks has to do with sociological research in general and social-desirability bias in particular. It looks at the way in which educational research has administered self-reporting questionnaires on the topic of motivation and considers the meta-validity of such an approach. The second theoretical framework that plays a key role in this study is of motivation in students. It has been developed by educators to identify what motivates learners to learn, to continue learning, and to seek out further learning.

Social-Desirability Bias

In some situations, respondents may be tempted to give a socially desirable response rather than describe what they actually think, believe, or do. The phenomenon of giving a socially desirable response (social-desirability bias) has been assumed typically to be a result of two causes: the general power of need for approval felt by an individual (personality trait) and the demands of a particular situation (Phillips & Clancy, 1972). In a questionnaire survey, the demands of a particular situation would include the supposed relative desirability or undesirability of the behavior referred to in a question (say, donating to a cancer charity or buying a product associated with a cause-related promotion). Hays, Hayashi, and Stewart (1989) also noted that socially desirable responding is in part a respondent and, in part, an item characteristic. In addition, the nature of the "behavior" under investigation may affect the tendency to respond in a socially desirable way or not. For instance, Holtgraves, Eck, and Laskey (1997) noted differences between socially desirable knowledge (Iraq war, Global warming), socially undesirable behavior (cheating, using illicit drugs) and socially desirable behavior (voting, volunteering for social causes).

Another important distinction has been made between social-desirability bias in response to a question being either a function of attempting to present oneself in a favorable light to others (interviewer and researcher), a self-esteem preservation function, or both. The first is known as "impression management" and the latter as "self-deception" or "ego defense"(Paulhus & Reid 1991). How conscious the respondent is of the self-delusion also may be significant when it comes to ways of eliminating, reducing, or minimizing the bias (Paulhus & Reid, 1991).

The present study measured the social-desirability bias for motivation self-reporting in an academic setting. Learning is a socially desirable behavior, just as voting and volunteering for social causes are socially desirable behaviors. Motivation is a highly complex mental function (Misch, 2002), therefore, the respondents in the present study were not conscious fully of how much (if at all) they are biased in their responses.

Adult Learner Motivation

In 1968, Malcolm Knowles (1968) proposed a “new label and a new technology” of adult learning to distinguish it from pre-adult schooling. Although some people attribute the word “andragogy” to Knowles, it was actually coined in 1833 by the German teacher, Alexander Kapp, who used it to describe the educational theory of Plato (Davenport & Davenport, 1985). Knowles’ theory is based upon five basic assumptions that differentiated adult learning from childhood learning (Misch, 2002), one of which concerned adult learner motivation: “While adults are responsive to some external motivators (better jobs, promotions, higher salaries and the like), the most potent motivators are internal pressures (the desire for increased job satisfaction, self esteem, quality of life and the like)” (Retallick, 1993).

The research conducted in order to create the foundation for Adult Learning Theory has used self-reporting questionnaires or interviews to gather data, the same way that the vast majority of behavioral data are collected in psychology and psychology-related fields (Petersen & Kerin, 1981). Without accounting for social-desirability bias, the aspect of Adult Learning Theory that deals with motivation may not be valid. The present research explores the motivation tenet of Adult Learning Theory through the lens of social-desirability bias.

Significance of Study

The assessment of social-desirability bias in motivational self-reporting contributes to the body of knowledge on motivation. If social-desirability bias exists in motivational self-reporting, these results raise serious questions about the validity of the AMS, along with most other motivational self-reporting tools. Consequently, it calls into question the educational implications and conclusions that have been drawn based on research using these techniques. Potentially, the widely accepted conclusion that positive academic performance is linked with intrinsic motivation (Fortier, Vallerand, & Guay, 1995) may need to take into consideration the self-reporting bias.

Definition of Terms

Following are the operational definitions of key terms used in this study. There may be other definitions of the terms listed below; however, for the purposes of this study, the stated definitions will apply.

Adult (or Nontraditional) Learner is an “individual who participates in systematic learning activities...among those whose age, social roles, or self-perception define them as adults” (Creighton & Hudson, 2002, p. 8). For this study, an adult was defined as someone that is over 18 years of age, has a high-school diploma or equivalent, and is enrolled in a Licensure Vocational Nursing certification program.

Adult Learning Theory is also known as “andragogy” – the art and science of helping adults learn (Kaufman, 2003). Andragogy is based on several assumptions about how adults learn, including the fact that adults are mostly intrinsically motivated to learn (Knowles, 1968).

Amotivation is when individuals do not perceive contingencies between outcomes and their own actions. The individuals are neither intrinsically nor extrinsically motivated (Vallerand et al., 1992). In this study, amotivation was measured by using the amotivation scale of the AMS questionnaire.

Direct (or Overt) Questioning is a questioning technique that instructs subjects or respondents to answer structured questions from the perspective of the subject or respondent himself or herself (Calder & Burnkrant, 1977). For example, a direct question could ask: “Have you used illegal drugs in the past?”

Extrinsic Motivation is a construct that pertains whenever an activity is done in order to attain some separable outcome. Extrinsic motivation thus contrasts with intrinsic motivation, which refers to doing an activity simply for the enjoyment of the activity itself, rather than its instrumental value (Ryan & Deci, 2000). In this study, extrinsic motivation was measured by the extrinsic scales of the AMS questionnaire.

Indirect (Covert) Questioning is a projective technique that instructs subjects or respondents to answer structured questions from the perspective of another person or group (Calder & Burnkrant, 1977). For example, a direct question could ask: “Have other people you know used illegal drugs in the past?”

Institution of Higher Education is a formalized educational setting above-and-beyond high-school level. In this study, such an institution is defined as a private institution accepting students with high-school diplomas or above, for the purposes of Licensure Vocational Nursing certification.

Intrinsic Motivation is an element that is within the learner himself or herself that drives the student into improved performance and persistence at a (in this case, learning) task.

In this study, intrinsic motivation was measured by using the intrinsic scales of the AMS questionnaire.

Intrinsic Motivation to Know is the fact of performing an activity for the pleasure and the satisfaction that one experiences while learning, exploring, or trying to understand something new (Vallerand et al., 1992). In this study, intrinsic motivation to know was measured by using the intrinsic motivation to know subscale of the AMS questionnaire.

Intrinsic Motivation Toward Accomplishments is the fact of engaging in an activity for the pleasure and satisfaction experienced when one attempts to accomplish or create something (Vallerand et al., 1992). In this study, intrinsic motivation toward accomplishments was measured by using the intrinsic motivation toward accomplishment subscale of the AMS questionnaire.

Intrinsic Motivation to Experience Stimulation is the fact of engaging in an activity in order to experience stimulating sensations (e.g., sensory pleasure, aesthetic experiences, as well as fun and excitement) derived from one's engagement in the activity (Vallerand et al., 1992). In this study, intrinsic motivation to experience stimulation was measured by using the intrinsic motivation to experience stimulation subscale of the AMS questionnaire.

Impression-Management (IM) is a function of social-desirability bias; a respondent's desire to present oneself in a favorable light to others (interviewer or researcher) (Nancarrow & Brace, 2000). In this study, impression-management is measured by the subscale of the BIDR questionnaire.

Motivational Autonomy: The degree to which a learner's motivation is autonomous in nature. Prior study showed that autonomous motivational is associated with perception of higher academic performance (Vallerand et al., 1992).

LVN Certification Program: A program that certifies licensed vocational nurses (LVNs). LVNs care for the sick, injured, convalescent, and disabled under the direction of physicians and registered nurses. Most LVNs provide basic bedside care: taking vital signs such as temperature, blood pressure, pulse, and respiration. They also prepare and give injections and enemas, monitor catheters, apply dressings, treat bedsores, and give alcohol rubs and massages. All states and the District of Columbia require LVNs to pass a licensing examination, known as the NCLEX-PN, after completing a state-approved practical nursing program. A high-school diploma or its equivalent usually is required for entry (United States Department of Labor, 2007).

Self-Deception Management (SDE) is a function of social-desirability bias; respondents desire to preserve his or her self-esteem, which is also known as “ego defense” (Nancarrow & Brace, 2000). In this study, self-deception management is measured by the subscale of the BIDR questionnaire.

Self-Reporting Bias is when study participants giving a false or skewed response on a questionnaire or during an interview with a researcher in order to appear in the best light (Fisher, 1993).

Social-Desirability Bias In each theoretical approach, there are more- and less-socially desirable motivational drivers. For example, a student may begin a course of study because he or she would like to obtain a job promotion. This is a valid reason, but possibly a less socially acceptable one than wanting to study simply for the joy of

learning or to improve oneself. The concept of reporting more socially acceptable results is what is known as “self-reporting bias” (Fisher, 1993).

Summary

Although educational researchers have linked intrinsic motivation with enhanced academic performance among adult students, the measurement of motivation stems from study participants’ own reporting. Research suggests that self-reported values may not be accurate, especially when the questions concern socially sensitive topics either because the person is attempting to deceive him- or herself (subconsciously) or is attempting to deceive the researcher (consciously). Therefore, the extent to which self-reporting motivational-measurement tools contain social-desirability bias needs to be measured in order to assess the validity of the findings that link intrinsic motivation to positive academic outcomes.

The next chapter delves into a review of relevant literature. This chapter focuses on motivational theoretical frameworks and how motivation is measured. Furthermore, it presents social-desirability bias, how it is measured, and methods for its reduction. Chapter III contains information about the methodology that was used to conduct the present study to measure social-desirability bias within a particular motivational measurement tool. Chapter IV provides study results. Chapter V contains a discussion of the study conclusions, an elaboration of the implications of the results, and provides suggestions for further research.

CHAPTER II

REVIEW OF LITERATURE

This study investigates social-desirability bias in motivational source self-reporting; therefore, a review of the relevant literature, first and foremost concentrates on research conducted on social-desirability bias, with a particular emphasis on reducing social-desirability bias through the use of indirect questions (a technique that will be used in this study). A second portion of this literature review will give a brief theoretical overview of motivation in adults, students, or both. This information will give the reader a balanced view of learner motivation as it has been developing over time.

The third major section of this literature review covers the various major methods of measuring motivation in research conducted thus far. The fourth section of this literature review focuses on a number of studies that have utilized the AMS questionnaire to measure student motivation. Finally, a section of the chapter reviews the various methods of measuring social-desirability bias, concentrating on the Balanced Inventory of Desirable Responding (Paulhus, 1986). The emerging body of knowledge demonstrates how social-desirability bias was measured and reduced in the present study. The concluding section brings together all the information that informed the design of this study.

Social-Desirability Bias

While investigating behaviors or attitudes of any population, the most straightforward method of data collection is observation. Observing behavior becomes difficult when complex attitudes and behaviors are concerned such as religiosity, marital happiness, work satisfaction, alienation, values, and so on (Phillips & Clancy, 1972). As Coleman (1969) noted, “most research techniques which analyze behavioral data take a

shortcut in data collection, and base their methods on individuals' reports of their own behavior" (p. 109). Indeed, a questionnaire is easily constructed; is easily portable; is able to ask questions about past, current, and possible future behavior (so-called "time travel"); and is easy to understand and to administer (Nancarrow & Brace, 2000). In some circumstances, respondents may be tempted to give the socially-desirable response rather than describe what they actually think, believe, or do (Nancarrow & Brace, 2000). The concept of giving a socially-desirable response while concealing true behavior or attitudes is known as social-desirability bias.

An individual's social-desirability bias is a function of two factors: the general strength of need for approval felt by the individual respondent and the demands of a particular situation. For a questionnaire survey, the demands of a particular situation would include the perceived desirability or undesirability of the attitude or behavior that is addressed in the question (for example, asking if a person donates to a charity, litters, takes illicit drugs, cheats on their spouse or partner, etc., Phillips & Clancy, 1972). Furthermore, a person may respond in a socially desirable fashion to a question in order to appear in a positive light to the researcher or interviewer ("impression management") or in order to preserve respondent's own self-esteem ("self-deception" or "ego defense," Paulhus & Reid, 1991).

Phillips and Clancy (1972) set out to test the effects of people's judgments of trait desirability and their need for approval on the responses to questions pertaining to overall happiness, religiosity, number of friends, marital happiness, prejudice, and visiting a doctor. They hypothesized that the more desirably people assess the traits, the greater the extent to which they will report being very happy, very religious, having many friends,

being happily married, being nonprejudiced, and visiting a doctor. Telephone interviews were conducted with a random sample of 404 adults representing all households with a listed telephone number residing in New England and Mid-Atlantic states. Participants were assured anonymity, and the researchers stressed that there were no right or wrong answers.

General happiness was measured by asking “Taking all things together, how would you say things are these days – would you say you’re very happy, pretty happy, or not too happy these days?” Religiosity was measured through the question “How religious would you say you are – very religious, somewhat religious, or not at all religious?” Number of friends was measured by asking “Thinking of people, including relatives, whom you consider really good friends – that is, people you feel free to talk with about personal things – how many such friends would you say you have?” Marital happiness-related question asked “Taking all things together, how would you describe your marriage? Would you say that your marriage was very happy, pretty happy, or not too happy?” Prejudice was estimated by asking, “If you went to a party and found that most of the people were of a racial or ethnic group different from your own, would you be very bothered, somewhat bothered, or not bothered at all?” Finally, the doctor visit question was a yes or no question, “I visit my doctor at least once a year.” In order to assess trait desirability of each variable, the researchers asked respondents to rate each of the above items on a 9-point scale of desirability. The more desirable they thought a characteristic to be, the higher the number they were asked to give it, and vice versa.

The results indicated a consistent pattern showing that people who perceive a characteristic as highly desirable, reported themselves as higher on that characteristic

(happiness, religiosity, etc.) than did people who perceived the trait as undesirable. The researchers admitted that people who believe visiting a doctor is “desirable” will be more likely to choose to visit a doctor than those who believe it to be “undesirable.” Although the phenomenon of individuals visiting a doctor viewing the action of visiting a doctor as desirable could explain that particular variable, the researchers argued that there should not be a relationship between individual’s perception of marital happiness as an important characteristic and that individual’s “choice” to be very happily married. The study findings overall demonstrate the presence of social-desirability bias, even though the researcher assured that there were no right or wrong answers and despite the assurances of confidentiality.

A study conducted by Fisher and Katz (2000) examined the effects of social-desirability bias on self-reported values. They noted that traditionally the extent to which social-desirability bias adds variance to a measure that typically is estimated by the correlation between the variable of interest and one or more social-desirability measures. In consumer research (Fisher and Katz’s background), the Marlowe-Crowne Social-Desirability scale (Crowne & Marlowe, 1960, 1964) has been used to assess social-desirability bias in measures of materialism, values, and compulsive buying. Nonetheless, as Jo (2000) noted, the Marlowe-Crowne scale and other similar social-desirability measurement scales do not allow for the measurement of how much each sensitive construct is affected by social-desirability. Additionally, the intent of the scale is very likely to be transparent to respondents, which can weaken the validity of the scale.

The researchers used a random sample of 2,035 telephone company customers and sent them a survey to be completed by the person in the household who most recently

had a birthday and who was 18 years of age or older. The response rate was 21%, with 430 respondents completing the survey. The survey measured consumers' values based on Rokeach's list of 18 terminal values, Maslow's hierarchy of needs, and other value research. The nine values included in the survey were self-respect, a sense of accomplishment, being well respected, security, warm relationships with others, a sense of belonging, fun and enjoyment in life, self-fulfillment, and excitement. The respondents were asked to rate the values on a 10-point scale ranging from "not at all important" to "highest importance."

The respondents also were asked to indicate which values are the two most important in their daily lives. To measure social-desirability bias, respondents completed a shortened version of the Marlowe-Crowne scale composed of 13 culturally approved behaviors (five worded positively and eight worded negatively) that have a low probability of occurrence. Examples of scale items include: "No matter who I'm talking to, I'm always a good listener," and "I sometimes feel resentful when I don't get my way" (reverse coded).

The analysis was performed using nine ordinary least squares regression equations, one for each of the nine values. The independent variables in each value model were the tendency to respond in a socially-desirable manner on the Marlowe-Crowne scale, respondent age, gender, education, and dummy variables representing membership in Asian-American, African-American, European-American, and Hispanic-American subcultures. The dummy variables were coded such that European-American respondents formed the reference category because this is the largest subgroup in the sample. Accordingly, a statistically significant positive beta coefficient for the Asian-

Americans, African-Americans, or Hispanic-American subgroup indicated that the value is more important in that subgroup than for European-American respondents.

Six out of nine values had statistically significant social-desirability bias components with standardized betas ranging from .10 for fun and enjoyment of life to .20 for warm relationships with others. Excitement was the least biased. The results suggest that impression management component was not present in all nine values tested. The researchers' hypothesis that the more important a value is to culture, the greater the social-desirability bias effect in self-reported measures received general support from the data. The four values most frequently identified as the most important in prior research (sense of accomplishment, self-respect, being well-respected, and warm relationships with others) had the largest estimates of social-desirability bias, ranging from $b=.12$ to $b=.20$. The rankings of the remaining values followed the expected pattern with the least bias related to excitement and a sense of belonging (ranging from $b=.00$, *NS*, to $b=.009$).

The researchers found that most values in the consumer-value inventory contain a social-desirability bias component. Respondents upwardly adjusted the importance of these values as a self-presentation tactic because they anticipated positive social feedback for doing so. Fisher and Katz (2000) noted that the significant social-desirability bias effect on the importance of being well respected is consistent with the individualistic nature of American culture. Correcting for social-desirability bias changed the ranking in the importance of some of the measured values. Sense of accomplishment fell from second to fifth in importance when social-desirability bias was removed from the raw mean. The researchers concluded that, although accomplishment is thought to be a central value in individualistic cultures in general and for US individuals in particular,

perhaps accomplishment is emphasized more in public than in private and US individuals may perceive some conflict between their personal values and societal expectations related to the pursuit of success. Furthermore, fun and enjoyment of life rose in rankings when social-desirability ranking was factored out. This particular research demonstrates the changes in perceived importance of consumer values that social-desirability bias introduces into a study based on self-reported values. Furthermore, this study introduces the use of a specific social-desirability-bias-measuring tool in order to ascertain the social-desirability effect. This is a method that will be employed in this study.

Reducing Social-Desirability Bias

If a potential source of social-desirability bias is the attempt of the respondent to appear in the best light in front of a researcher (Paulhus & Reid, 1991), a potential remedy would be to assure the participant of absolute anonymity. The potential for social-desirability bias would be most applicable to questionnaires – if a respondent is not asked to put down any identifying information about him- or herself, perhaps social-desirability bias would be decreased. Singer, Hippler, and Schwarz (1992) conducted a study that was intended to measure the public's willingness to participate in surveys given assurances in confidentiality. The research was carried out in Germany, in two parts.

The first experiment was carried out in 1988 at the University of Mannheim, where students were approached in the dining room of the university by a female research assistant and handed a description of a "Survey of Student Life," a questionnaire that was assumed by the researchers to be a nonsensitive topic to students. The instructions to the questionnaire varied between three levels of confidentiality assurance: no mention of

confidentiality, low confidentiality – one sentence referring to the confidentiality of the survey, and high confidentiality – several sentences referring to the confidentiality of the survey and to the German Data Protection Law. In addition, students in the high confidentiality group were given a one-page description of how the confidentiality of their replies were going to be guarded. A total of 159 students were included in the study, with 42 in no confidentiality group, 52 in low confidentiality, and 65 in high confidentiality. The results show a decreasing willingness to participate in the survey as the assurances of confidentiality increased (76.2%, 61.5%, and 49.2% participation, for the three groups, respectively).

The second experiment was designed to test the researchers' hypothesis that the reason greater assurances of confidentiality lead to higher refusals is because they change respondents' perception of the threat of the interview. As in the first study, students were approached at a dining hall and asked to fill out a questionnaire on student life. Forty-eight students agreed and were again randomly assigned to the same three confidentiality conditions as described above. The participants were asked to indicate, on the questionnaire, their willingness to participate in the upcoming survey and – regardless of whether they agreed to participate or not – what their expectations were concerning the survey questions. Respondents given an elaborate assurance of confidentiality expected the questionnaire to contain more questions they would not like to answer, expected more personal questions, and expected more threatening questions. Furthermore, regardless of researchers' assurances, the students in the high-confidentiality group were more likely to believe that the data likely will fall into the wrong hands.

The results of the study, although not directly addressing social-desirability bias, shows that assurances of strict confidentiality elevated the respondents' social-desirability guards. The students thought that they would be asked uncomfortable questions that they would not like to answer, and the students were more afraid that the data would not remain confidential than the students to whom no confidentiality or very little confidentiality was assured explicitly. If respondents approach the questionnaire already afraid of the threatening questions that they believe will be asked, social-desirability bias may be more pronounced.

Booth-Kewley, Edwards, and Rosenfeld (1992) conducted their research in order to identify whether social-desirability bias was affected by the format of the questionnaire. The researchers hypothesized that individuals would have a decreased impression management (IM) - attempt to look better in front of a researcher and a decreased self-deceptive enhancement (SDE) - attempt to look better to yourself on a computer survey rather than on the paper-and-pencil survey. Two-hundred-forty-six male Navy recruits completed several questionnaires in either a computer-administered or paper-and-pencil condition and in either an anonymous or identified condition. Identified respondents answered questions that were impression-management related in a more favorable light than unidentified respondents. Despite this difference between identified and unidentified respondents, there was no systematic difference between computer and paper-and-pencil modes. The researchers concluded that computer and paper-and-pencil modes of administration yielded similar responses on attitude questionnaires.

A related study expanded the above theme also to ask respondents questions about risky (socially undesirable behaviors) about alcohol use and risky sex. Booth-Kewley,

Larson, and Miyoshi (2007) asked 300 college students to complete several questionnaires in either a computer-administered or paper-and-pencil condition that included risky-behavior questions. Based on the results of Booth-Kewley et al.'s study, the researchers hypothesized that there would be no difference in IM or SDE between paper-and-pencil and computer survey respondents. Participants who filled out the questionnaire with the help of the computer scored higher on self-deceptive enhancement than those completing the survey on paper. No differences in impression management were found. Finally, respondents using the computer reported a higher level of alcohol consumption and riskier sexual behaviors than those in the paper-and-pencil condition. The researchers concluded that computer administration of surveys may create a social satiation that produces a sense of disinhibition in respondents, and this sense of disinhibition may lead to greater reports of risky (socially undesirable) behaviors.

The two studies come up with two quite different conclusions (although the two study populations were very different – male Navy recruits and mixed-gender college students), and further research indicates that there is no general agreement to the effect on social-desirability bias to the mode of survey administration (Nancarrow & Brace, 2000). For the purposes of this research study, the ultimate conclusion is that there is no compelling reason to use the computer instead of pencil-and-paper as it refers to affecting social-desirability bias.

Raghubir and Menon (1996) studied counterbiasing – a method for reducing social-desirability bias that involves introducing socially undesirable behavior as “normal” (Sudman & Bradburn, 1974). A total of 80 undergraduate students enrolled in an introductory marketing course at a large Northeastern university participated in this

experiment for partial course credit. In the experimental condition, participants were exposed to a short paragraph that included the counterbiasing information, whereas those in the control condition did not see this information. All participants then responded to the dependent measure. The counterbiasing wording told the participants that a typical student, John, uses a condom once every five times that he has intercourse. The dependent measure asked those participants that had responded that when they had had sexual intercourse at least once to indicate what percentage of time they used a condom during intercourse. The reported odds of using a condom versus not using a condom significantly decreased when counterbiasing information was presented.

Reducing Social-Desirability Bias Through Use of Indirect Questions

Fisher (1993) conducted a study in order to measure how social-desirability bias is affected by the method of questioning. In particular, he noted that indirect questioning is thought to reduce the distortion of private opinions that are revealed to the researcher by asking respondents to “report on the nature of the external world” (p. 304) rather than about themselves. He hypothesized that respondents would project their unconscious biases into ambiguous response situations and would reveal their own attitudes. A convenience sampling of 184 male and female undergraduate students was selected and randomly assigned to one of four conditions (direct question and anonymous, direct question and not anonymous, indirect question and anonymous, and indirect question and not anonymous). Each condition had 64 study participants. A student sample was selected because of the widespread study of this population in consumer research on normative influence and other socially sensitive topics. To enhance involvement,

subjects were shown a mock-up of the new product, a professionally designed brochure layout and entered in a drawing for three \$50 prizes for participating in the study.

Students were told that the purpose of the study was to generate information to be used in the advertising campaign for a new product targeted at college students. For this purpose, Fisher (1993) selected a fictional new product: innovative stereo headphones. A pretest conducted indicated that the target demographic expressed interest in such a new product. Furthermore, the pretest showed that students perceived that adoption of such a product had important social implications because of its visibility. In the direct-questioning condition, students were asked to respond to a series of items in terms of their own beliefs and evaluations, whereas in the indirect-questioning condition, students were asked to predict the likely responses of a typical college student. Anonymity condition was changed by giving respondents different probabilities that they would have to discuss their answers with a researcher after completing the survey. Furthermore, the nonanonymous respondents were asked to include their student identification numbers.

The questions asked were designed specifically for the student sample and the new headphone product. For personal outcomes, a pretest indicated that one of the fictional new product's key advantages was the increased freedom of movement it afforded. This attribute was identified by pretest respondents as being intrinsically valued - desirable regardless of the social aspects of consumption. Consequently, beliefs and evaluations of personal outcomes were measured with items such as "the new headphones provide more freedom of movement than other headphones." For normative outcomes, students were asked to indicate their beliefs and evaluations of statements such as "students I know would have a favorable reaction if I bought one of the new products."

The belief components of the outcome variables were measured with 7-point “highly likely” to “not at all likely” scales. The evaluation components were measured with 7-point “very important” to “very unimportant” scales. For hypothesis testing, the multi-item scales were summated to form a single indicator of each construct.

Confirmatory factor analyses were conducted for the individual two-factor models within the direct and indirect questioning groups. Both models had acceptable internal and external consistency with an overall χ^2 of 34.25 ($df = 19, p = .017$) with a goodness of fit index of .92 for the direct group and a χ^2 of 33.45 ($df = 19, p = .021$) with a goodness of fit index of .92 for the indirect group. The normed-fit index indicated that 91% of the observed-measure covariation is explained in each of the measurement models. Furthermore, the scales exhibited good internal consistency with Cronbach’s coefficient alphas for personal outcomes of .79 (direct) and .81 (indirect) and for normative outcomes of .91 (direct) and .89 (indirect).

Data from the experiment were analyzed with an analysis of variance (ANOVA). First, the anonymity manipulation was evaluated via a summated four-item manipulation check on perceived anonymity. The manipulation was successful given a statistically significant main effect of the of the manipulation on perceptions of anonymity ($F(1,180) = 90.42, \eta^2 = .33$, which is a large effect) with the anonymous mean ($M = 17.17$) higher than the unanonymously mean ($M = 10.96$). No unintended main or interaction effects were found. To evaluate whether the anonymity manipulation may have caused students to perceive that they were more accountable for their responses than students in the unanonymously condition, thus causing the students in this group to respond more carefully, a summated four-item manipulation check was used to measure students’

perceptions about the care with which they responded. No statistically significant effects were found for anonymity, questioning method, or anonymity x questioning method or response care.

The hypothesis that method of questioning has no effect on mean personal outcomes was supported ($F(1,180) = .43, NS$), with similar means in both the direct ($M=109.4$) and indirect ($M=111.8$) conditions. The hypothesis that indirect questioning reduces social-desirability bias, resulting in higher mean normative outcomes was supported ($F(1,180) = 43.15, \eta^2 = .19$, which is a large effect), with the indirect questioning mean ($M=65.8$) higher than the direct-questioning mean ($M=36.4$). These two results indicated that students made the same evaluations for a socially neutral variable across questioning conditions but reported statistically significantly lower evaluations for a socially sensitive (undesirable) purchase motivation when asked directly.

The hypothesis that anonymity has no effect on mean personal outcomes was supported ($F(1,180) = .02, NS$), with similar means across the anonymous ($M=110.3$) and unanonymous ($M=110.8$) conditions. This result suggests that personal outcomes are independent of social influence because students made the same evaluations for themselves as for others, regardless of the anonymity of their responses. The hypothesis that removing anonymity increases social-desirability bias, resulting in lower mean normative outcomes under direct questioning was supported with a simple-effects test that revealed a statistically significant reduction ($F(1,180) = 3.97, \eta^2 = .02$, which is a small effect) in mean normative outcome scores in the direct-questioning condition

($M_{\text{anonymous}} = 42.7$ and $M_{\text{unanonymous}} = 30.1$) but not in the indirect-questioning condition ($M_{\text{anonymous}} = 61.1$ and $M_{\text{unanonymous}} = 70.5$).

The results of this experiment suggest that indirect questioning operates to mitigate social-desirability bias and does not affect systematically the means of variables that are independent of social influence. The pattern of effects implies that study participants projected their own beliefs and evaluations when responding to indirect questions. Furthermore, the lack of questioning method and anonymity effects on self-reported personal outcomes is evidence that personal outcomes are independent of social influence and that indirect questioning did not systematically bias means of variables of this type. The lack of an anonymity effect suggested that students' self-reports of personal outcomes were not influenced by the threat of social pressure. Study participants made very similar predictions in the direct- and indirect-questioning groups for personal outcomes. The lack of a main effect for questioning method on personal outcomes suggests that students projected their own beliefs and evaluations into the ambiguous response situation. Essentially, no systematic upward or downward bias resulted from asking students to make predictions about typical others as opposed to making evaluations in the first person.

By contrast, indirect questioning produced a very different pattern of responses for self- and typical-other questions. Mean estimates of normative outcomes varied across questioning-method conditions and removing response anonymity lowered mean normative outcomes with direct questioning. The effect of questioning method on normative outcomes and the lack of effect for personal outcomes implied that social-desirability bias is operating on self-reported normative outcomes. The conclusions that

are relevant for this review of literature indicate that indirect questioning is a valid method for reducing social-desirability bias.

Jo, Nelson, and Kiecker (1997) conducted a study that employed the methodology developed by Fisher (1993) – as described in the previous paragraphs – for reducing social-desirability bias through the use of direct and indirect questions. They interviewed telephone interviewers at 316 marketing research firms across the US by asking direct questions regarding the participants' job satisfaction, achievement attitude, and morals, and they asked both direct and indirect questions about “proscribed behaviors” – defined as deviations from proper research conduct and include such actions as filling in a response to an item that is refused, interviewing someone known to be unqualified, and so on. Because proscribed behavior represent a very sensitive issue to be addressed by self-report measures, and thus, to social-desirability bias, indirect questions were used. The researchers believed that satisfaction with job, achievement attitude, and morals are likely to be related to the incidences of the proscribed behaviors, that is, when telephone interviewers are satisfied with their jobs, they are likely to show more sincere attitudes toward their jobs, resulting in fewer proscribed behaviors.

Completed and usable questionnaires were received from 173 interviewers out of the 568 questionnaires sent, for a response rate of 30.5%. On the three exogenous constructs (job satisfaction, achievement attitude, and morals), the respondents were asked to evaluate the direct wording items on a 9-point scale ranging from “strongly disagree” to “strongly agree” scales. The items of each construct were purified on the basis of exploratory factor analysis and Cronbach's coefficient alpha. The resulting four items (“I really like my job,” “My company is a great place to work,” “I have a very

positive attitude about my job,” and “my work is quite satisfying”) measured the construct of satisfaction with job (Cronbach’s coefficient alpha of .89). Two items (“I try to accomplish something worthwhile everyday” and “In general, I try to make every minute count”) measured the construct of achievement attitude (Cronbach’s coefficient alpha of .66). Three items (“I consider myself a very moral person,” “In business, it’s necessary to be a little dishonest sometimes,” and “I sometimes do things conscience says wrong”)—measured the construct of morals (Cronbach’s coefficient alpha of .71).

For the endogenous construct (proscribed behaviors), respondents were asked to indicate how many out of the 100 interviews they (direct questioning) and typical interviewers (indirect questioning) recently have turned in contained each of the proscribed behaviors. The question wording for direct questioning was “Out of 100 interviews that you recently turned in, how many interviews do you think contained the following behaviors” (Fisher & Tellis, 1998, p 433). The wording for indirect questioning differs from the one for direct questioning only to the extent that a third-person wording (“a typical interviewer”) is substituted for the first-person wording (“you”) for the same items. The indirect questions were asked immediately before the direct ones. The five items (“filling in a response to an item that’s been refused,” “incorrectly recording identification data to prevent verification,” “misrecording the length of an interview,” “misrepresenting the number of attempted callbacks,” and “interviewing someone known to be unqualified”) measured the endogenous construct for both direct and indirect questioning (Cronbach’s coefficient alpha of .76 for direct questioning and .86 for indirect questioning).

An exploratory factor analysis of the 10 items (five items from direct questioning and the same five items from indirect questioning) showed a three-factor solution. The 10 items loaded relatively highly on a common factor, showing that both direct and indirect questioning measure the endogenous construct (proscribed behaviors). The items loaded more highly on their respective questioning type, showing the existence of method variance. Thus, for the measurement model of the endogenous constructs, the 10 items loaded not only on the common factor of proscribed behaviors but also on their respective method factors, direct or indirect questioning, to take into account method variance. Confirmatory factor analysis of the measurement model showed satisfactory results (chi-square/*df* 5 1.97 (53.3/27), Goodness-of-Fit Index of 5.93 and Root Mean Squared Residual of 5 .04). In addition, values of standard residuals, error variances, correlations, and factor loadings of the measurement model were not much different from the normal values, indicating that the interactions between trait and method factors in the model are not serious.

A *t* test was used to test for statistical significance. As expected, interviewers reported statistically significantly fewer incidences of proscribed behaviors for direct questioning (“for themselves”) than for indirect questioning (“for typical interviewers”). Mean values for the five items of direct questioning were .81, .92, 5.5, 2.7, and 1.2, respectively, whereas mean values for the same five items of indirect questioning were 14.1, 12.9, 22.3, 13.2, and 11.8, reflecting the existence of serious social-desirability bias for direct questioning and the effectiveness of indirect questioning. The incorporation of responses to the exogenous constructs showed that the indirect-question responses were correlated negatively with job satisfaction, achievement attitudes, and morals. The

results show that such a model effectively controls social-desirability bias, identifying accurate trait relationships among constructs.

Fisher and Tellis (1998) continued the research into indirect questioning as a method of reducing social-desirability bias. The study they conducted sought to assess the validity of indirect questions by evaluating the extent to which they contain information about the self. The researchers did so by comparing the performance of direct and indirect measures of the importance of social approval in consumption. Consumption is the chosen variable because social influence is pervasive in consumer behavior, and yet consumers tend to understate its importance on self-reports.

The researchers used 12 undergraduate students to identify five top products with the highest importance of social approval in the brand decision in a pretest. The five products were athletic shoes, spring-break vacation destination, music, hair style, and cologne or perfume. After the completion of the pretest, a convenience sample of 75 male and female undergraduate students was used to test the main hypotheses. Respondents were asked to provide evaluations of the importance of social approval for themselves (direct question) and the typical student (indirect question) in the purchase of each of the five products.

The following two question stems were used: "It's very important TO ME that others approve of my purchase of each of the following five products" and "It's very important TO THE TYPICAL STUDENT that others approve of his or her purchase of each of the following give products." Items were measured on a 7-point scale ranging from "Strongly Disagree" to "Strongly Agree." Additionally, the tendency to respond in a socially desirable manner was measured with the Marlowe-Crowne Social-Desirability

scale. The researchers calculated a corrected direct score by adding the responses to the five directly worded questions with the social-desirability bias (as measured by the Marlowe-Crowne) removed. Additionally, an estimated true score was calculated by using a factor analysis in which a single factor solution was specified using the five direct items and the five indirect items, even though the fact that a factor analysis is problematic to use with a sample as small as 75 participants.

The results showed a statistically significant difference in the means for the two types of questions (direct and indirect) and the extent to which they were correlated with the Marlowe-Crowne test. Respondents evaluated social approval to be more important for the typical student than for themselves. Based on a dependent-sample t test, a statistically significant difference existed between direct questions related to the self- and indirect questions related to the typical student (Mean(self)=11.2 S.D.=6.3, Mean(typical student)=19.0 S.D.=6.5). Finally, the calculated estimated true scores had a stronger correlation ($r=.93$) than direct ($r=.61$) questioning.

Hui (2001) used a slightly modified technique of incorporating direct and indirect questions in order to reduce social-desirability bias that is based on Fisher's (1993) method. Hui incorporated a pretask where the participant is asked how others would respond to the questionnaire (indirect questions). This portion, although collected, is not scored. Participants then provide their own self-rating, which is scored. The method is called a double-rating method (DRM).

Ninety-one Hong Kong-Chinese students enrolled for an introductory psychology course took part in the study and were given the Marlowe-Crowne Social-Desirability scale that had been translated into Chinese. The students were assigned randomly to two

groups. Hui (2000) indicated that both groups were balanced for gender, although no exact count of students' in each group was given. In the control condition, participants simply completed the Marlowe-Crowne instrument. In the experimental condition, participants gave two sets of answers. First, respondents answered the question, "Which answers do you think people would choose in order to appease others?"

After completing this pre-assessment other-rating task, participants rated items according to the question, "How accurately do the statements describe your own behavior and attitudes?" The participants were not told about this second, self-rating task until they had completed the first. The internal consistency for the social-desirability scale was reasonably high (Cronbach's coefficient alpha = .78). The scores obtained with the double rating method ($M = 15.12$) were lower than were those in the control condition ($M = 17.75$). No other effect reached statistical significance.

To test the robustness of these results, Hui (2001) conducted a second study in a culturally different population. Furthermore, he was attempting to determine the mechanism underlying the study's results. The researcher suspected that the other-rating task alerted respondents to the human tendency to answer in socially desirable ways, implicitly suggesting to the respondent that one must be more honest than the others. The other possibility was that the other-rating task may make respondents believe that, although they have been acting or thinking in socially undesirable ways, they are not in the ethical minority, thereby making the respondent be more honest.

The sample for this second study consisted of students in a social psychology class at a Canadian university. The comparison group ($n=39$) simply responded to the MCSD questionnaire under standard instructions. The experimental group ($n=50$) were

first instructed to indicate which answers they thought the comparison group would be most likely to give. They also estimated the percentage of people giving that particular response. In the second part of the experiment, they completed the MCSD scale again, this time answering for themselves.

The other-rating score (the number of people the participants in the experimental group attributed to the comparison group) ranged from 2 to 18 ($M=8.86$). Within this group, the average percentage of people assumed to give a social-desirability biased response to a certain item ranged from 23% to 67% ($M=40%$). In the same way as in the first study, students who had been given the double-rating task scored statistically significantly lower than did those who had received the conventional instructions (9.98 vs. 12.36). In addition, the correlation between the other-rating and the self-rating scores was .37. Participants with high social-desirability bias scores projected high scores onto others; although as a group, they tended to assume that other will be more candid than they actually are. Respondents who assume that a large number of people will respond positively to a particular item are more likely to respond in the same positive direction. The converse is also true.

The four studies presented above demonstrate that indirect questioning is an appropriate method of reducing social-desirability bias on sensitive constructs. The answers to indirect questions given by respondents allow them to demonstrate their true attitudes (Fisher, 1993). Moreover, posing indirect questions is a better strategy for removing social-desirability bias than adjusting answers to direct questions by using a social-desirability-specific questionnaire (Fisher & Tellis, 1998). Finally, the results of Hui's (2001) study suggests that instead of projecting true feelings into answers to

indirect questions, preceding direct questions with indirect questions gives respondents a chance to contemplate other people's probable responses and to admit to those thoughts and behaviors themselves. The importance of this study to the present literature review is in validating the utilization of indirect questions as a means for reducing social-desirability bias. Although Hui's results indicated that the order in which direct and indirect questions are asked affects the social-desirability bias in respondents, no additional primary research has been found on this particular topic.

Motivational Theories and Conceptual Frameworks

At different points in the history of research on motivation and in different sub-disciplines of psychology, motivation has been conceptualized in various ways. Freud viewed motivation as resultant from aggressive and sexual drives and motivated behavior as the interaction of these drives and the ego. In the 1950s, drive theories were replaced largely by need theories, most notably Atkinson's and McClelland's need for achievement (Urdan & Schoefelder, 2006). This view of motivation attributed motivational attitudes and actions as strictly originating from an individual.

One of the most influential theories that added a focus on the features of achievement is Behaviorism (Skinner, 1954). According to this perspective, the motivation to engage in a task comes from the contingencies associated with similar tasks, that is, if an individual is reinforced for working on his or her other homework, he or she is likely to be motivated to work on similar kind of assignments in the future. Conversely, lack of motivation as well as punishment will lead to reduced motivation on similar tasks in the future.

Around the 1980s, motivation theory shifted its focus to a social-cognitive perspective (Bandura, 1986) by emphasizing that students' motivational beliefs are influenced by messages from the teacher about the difficulty of the task; perceived abilities of classmates; information about the importance of learning the material; influences from friends, peers, and family; and so on. This framework shifts the source of motivation away from the individuals themselves and away from the specific context of the learning materials and toward the learning environment as well as the key players who populate the learning environment. Related to the social-cognitive perspective lies the attribution theory (Weiner, 1985), which states that motivation to learn is contingent on how individuals interpret past successes and failures.

Yet another direction approaches motivation theory from a self-determination perspective (Deci & Ryan, 1985). This structure focuses on the distinction between students who engage in particular academic tasks for the intrinsic benefits associated with the task (intrinsic motivation), in order to receive some sort of extrinsic reward (extrinsic motivation) or are amotivated. This is the theoretical backbone that was used by Vallerand et al. (1992) to develop the Academic Motivation Scale (AMS). AMS is the instrument that is used in the present study. An in-depth overview of some primary research conducted using the AMS is presented in the next section.

Motivation Measurement

Bye, Pushkar, and Conway (2007) conducted a study comparing the motivational components of academic life for traditional and nontraditional university undergraduates. Traditional students were defined as those aged 21 and younger, who were most likely to have followed an unbroken linear path through the education system, whereas

nontraditional students are defined as those aged 28 and older, for whom the undergraduate experience is not necessarily age normative. The study hypothesized that nontraditional students would report higher levels of intrinsic motivation than traditional students, whereas traditional students would report higher levels of extrinsic motivation than nontraditional students.

The sample consisted of 300 undergraduates ranging in age from 18 to 60 years old (average of 25 years old) who were enrolled at a midsized urban university. They were recruited at a booth set up in the lobby of the campus library and given 10 dollars for participating in the study. Seventy-four percent of the participants were attending the university on a full-time basis, 61% of all participants worked in addition to going to school. Of the students who worked, 13% worked 21 hours per week or more and 48% worked 20 hours per week or less. The students were asked to fill out a short demographic questionnaire as well as three self-report questionnaires (one of them being motivational).

The first questionnaire was the Motivated Strategies for Learning Questionnaire (MSLQ). This questionnaire was designed to assess students' motivation orientation and their use of different learning strategies for a given course. The questionnaire contains 31 motivation-related questions, which were used in the study. Data analysis was limited to the subscales of Intrinsic Goal Orientation (student self-perception of participating in a task for the sake of challenge, curiosity or mastery) and Extrinsic Goal Orientation (student self-perception of participating in a task for the sake of grades, rewards, or performance comparison). The questionnaire is ranked on a 7-point Likert-type scale ranging from "not at all true for me" (1) to "very true for me" (7). The Cronbach's

coefficient alphas for the Intrinsic and Extrinsic Goal orientation subscales produce internal consistency estimates of .74 and .62, respectively. The second and third questionnaires assessed participants to rate how often they felt a particular emotion in their daily lives as well as in the past year (example: “How often do you feel so interested in what you’re doing that you’re caught up in it?”). The emotions that were measured were interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active.

The students were divided based on their age into traditional and nontraditional groups for the purposes of analysis. The study had a total of 108 traditional and 61 nontraditional students. The results showed that traditional students reported slightly less motivation overall than nontraditional students. Older nontraditional students reported higher mean levels of intrinsic motivation than did traditional students. Both groups in the study reported equal amounts of extrinsic motivation to learn. Intrinsic motivation predicted positive effect. Nontraditional students maintain a higher threshold of intrinsic motivation to learn with an accompanying increase in positive affect. Younger (traditional) students did not report the same degree of need to enjoy the educational process to persist within the system as did older students.

Yet another study made use of the MSLQ questionnaire as described below. Davis, Winsler, and Middleton (2006) examined college students’ perceptions of the provision of extrinsic rewards given by parents and teachers for academic performance from elementary school through high school. The researchers also examined the relation between reward history and student motivational orientation. The sample included 136 undergraduate students (76 women) attending a large public university in the mid-

Atlantic region. The students' mean age was 19.9 years, and the majority of the participants were freshmen (55%) and declared majors in the College of Arts and Sciences (48%). The median annual family of origin income was \$61K-\$80K.

Students were asked to complete one large survey packet and were given one hour to do so. The packet included a questionnaire on academic reward history where participants were asked about how frequently they received rewards during different school periods (elementary school, middle school, high school) using a 6-point Likert-like scale from never (1) to all the time (6). The questionnaire asked students to indicate what kinds of rewards they received, who they received them from (parents or teachers), and the school periods in which they received them). The students were asked to indicate their current Grade Point Average (GPA) on a 9-point scale and indicate the highest level of education they planned to complete. Finally, they filled out the MSLQ questionnaire.

The results indicated that 73% of the students received rewards in elementary school, 72% in middle school, and 74% in high school. Slightly more than half (51%) of the students received money for good grades in high school. Overall, students recalled receiving rewards of some type for grades from their teachers during all grade levels. The participants were more extrinsically motivated than intrinsically motivated, had average academic performance (3.0), and had reasonably high educational aspirations (some graduate study). Extrinsic motivation was greater for female college students than for male students. For boys, receiving greater amounts of external rewards for school performance in early schooling is overall associated with greater extrinsic motivation. For girls, overall reward history was related negatively with extrinsic motivation. The more girls reported receiving external rewards during their childhood, the less

extrinsically motivated they were – a finding that was completely opposite of that for boys.

The motivational measurement tool utilized in the two studies described above (Bye et al., 2007; Davis et al., 2006) is similar to the instrument used in the present study in several ways. First, it is graded on a Likert-like scale. Second, it distinguishes between intrinsic and extrinsic motivations. Unlike the instrument used in the present study, the MSLQ does not break down intrinsic orientations into subcomponents. Furthermore, it does not have a separate subscale for amotivation. In the same way that the Academic Motivation Scale (AMS) does not account for social-desirability bias, the MSLQ also does not account for social-desirability bias. It is of note that prior research quoted by Bye et al. (2007) indicated that most students report higher motivational levels than on other motivational-self reporting tools (averages are above 5 on a 7-point Likert-like scale).

Stewart-Strobelt and Chen (2003) developed their own survey instrument to determine why students choose to take a particular foreign language in school. The 164 participants attended a high school in a medium-sized city located in Western Washington. Seventeen percent of the students were receiving free or reduced-price lunches. The school had a graduation rate of 96%. Over half of the surveys (54%) were from females. Students taking Spanish comprised 51% of the sample, 21% were students taking French, 26% were students taking German, and 2% were students taking Russian. The survey consisted of three sections. The first section consisted of demographic information. The second section consisted of a list of eight factors that could be instrumental when making a choice about which foreign language to pursue (interest in

language or culture, family heritage, career advantages, friends in class, parents' preference, like teacher, perceived ease, and counselor's advice). The final section contained nine statements about students' general attitudes toward learning foreign languages, accompanied with a Likert-type scale ranging from "strongly agree" to "strongly disagree." The subscales in this motivation-attitude-related questionnaire were "positive attitude toward learning a foreign language" (example: "learning this particular foreign language will enhance my career possibilities") and "negative attitude toward learning a foreign language" (example: "Americans should not have to learn to speak another language because English is the international language"). The surveys were distributed to five foreign-language teachers at the high school, and they were instructed in how to administer the survey to the students.

"Interest in the language or culture" was the factor that most influenced students' choice of a particular foreign language (61% of the students marked it first, second, or third). "Career advantages" came in second (52% of the students marked it first, second, or third) and "perceived ease of learning the language" was third (47% of the students marked it first, second, or third). There was no difference between the genders in this respect. In the motivational-attitude portion of the questionnaire, more girls than boys indicated that taking a foreign language would enhance their career possibilities across all languages. Students enrolled in German were most likely to have friends who spoke the language. Thirty-eight percent of the boys and only 14% of the girls agreed that they were taking the course to fulfill their college credit requirements, indicating more intrinsic motivation in girls. Overwhelmingly (72%), students said that they were taking the language that they wanted to study.

Although this study did not use a measurement tool that measures motivation explicitly, the researcher drew several conclusions about students' motivation toward studying a language in high school. This particular instrument is not rigorous in pinpointing the respondents' motivational orientations. Although it considers that a student may have taken a class because a language was easy to study or because the students' friends were enrolled in the class, it does not consider the possibility of social-desirability bias while self-reporting.

McLellan (2006) evaluated whether the wildly different results from the implementation of a United Kingdom-based school intervention program called Cognitive Acceleration through Science Education (CASE) is due to the students' different motivational world views. The CASE program was implemented originally in the 80s and is administered to seventh and eighth graders in the United Kingdom to promote cognitive development. Prior research has shown that students participating in CASE achieve higher grades in science, mathematics, and English when compared with students who did not participate in the intervention. Among students who participated in CASE, academic outcomes varied widely. McLellan hypothesized that it is the students' motivational world-view that is responsible for the academic achievements or lack thereof.

The study conducted was longitudinal and spanned a 2-year period after the CASE intervention. Because CASE is run a whole-school basis, when a school chooses to opt into CASE, the whole science department is involved; therefore, it was not possible to conduct a true experiment. The same instruments were used pre-CASE and post-CASE. Two different tests were used to assess the students' cognitive levels. To assess

the motivation, the researcher used the Motivational Orientation Scales (MOS) questionnaire. Students were asked to think about when they feel they have had a really successful day at school and then respond to a number of items. Each item has the common stem “I feel successful when...,” and students responded on a 5-point scale ranging from (1) strongly disagree to (5) strongly agree. The resulting 21 items span the four scales of task, ego, work avoidance, and alienation orientations. Furthermore, to evaluate the world-view of the students, McLellan used the Classroom Belief Scale and Multidimensional Measure of Children’s Perceptions of Control instruments that asked students about reasons why people do or do not do well in school.

The results suggest that students do hold one of a number of different world-views at the start of secondary schooling. Thirteen percent of the students are motivated primarily to develop competence (Task world-view). These are the students that were most helped by the CASE intervention. Over one-half of all students are concerned with both developing competence and demonstrating it to others: Performance (21%), Performance by the Easy Route (26%), or Strong Responder (13%) world view. The majority of the students are motivated both by the desire to learn new things and by how they look in front of others. Changes in world-view over the 2-year period, however, were not associated with increased cognitive abilities.

The instrument used in this study was a Likert-like scale, as have the other instruments presented in this section thus far. The difference in wording asks the respondents to think about a successful day at school and describe the qualities that make it successful – both from the point of view of the student him- or herself as well as from the point of view of the student’s peers, family, and so on. Similarly to the studies

presented above using the MSLQ (Bye et al., 2007; Davis et al., 2006), the motivational self-reporting instrument does not consider social-desirability bias.

Glynn, Taasoobshirazi, and Brickman (2006) measured the motivation to study science for nonscience majors using the Science Motivation Questionnaire (SMQ). At a public university with over 25 thousand undergraduate students in the Southern United States, the researchers surveyed 369 undergraduate students (282 women and 87 men) enrolled in two sections of a 15-week semester course for nonscience majors, with 3 one-hour lectures and a 2-hour laboratory each week. The students were asked to provide their science grade point average (GPA) for any courses that they have taken already, such as chemistry, geology, geography, astronomy, or physics. To measure their science motivation, the students filled out the 30-item SMQ. The items on the SMQ were developed with 6 subscales (intrinsically motivated science learning, extrinsically motivated science learning, relevance of learning science to personal goals, responsibility (self-determination) for learning science, confidence (self-efficacy) in learning science, and anxiety about science assessment). The items were on a 5-point Likert-type scale ranging from 1 (never) to 5 (always). The last subscale (anxiety about science assessment) was reverse scored. Furthermore, students were asked to write an unrestricted essay to describe their motivation to learn science.

More women believed that science was relevant to one's career. Neither the women nor the men, however, believed that science had "high" relevance to their careers. There was no statistically significant difference in the motivation ratings of the women and men. The additional essays indicated that many students found science relevant to their health, life, and understanding of the world. There was no statistically significant

difference between the science GPA of the women and the men (both had an average of B). The belief that science was relevant to one's career was related to higher motivation and to a higher science GPA.

The SMQ questions were constructed to strictly relate to science. Although the present study participants are in the health field and attending schooling with a heavy emphasis on science, the questions that will be used are far more general in nature. Furthermore, although the SMQ does break out intrinsic and extrinsic motivations to learn science, the researchers simply put the two variables together for their analysis. Combining the intrinsic and extrinsic motivation subscales would not allow a comparison back to the Adult Learning Theory, which would compare study findings with the theoretical framework.

Academic Motivation Scale

The AMS originally was developed in French. The researchers who developed the instrument consequently set out to translate it into English using appropriate cross-cultural procedures, to replicate the structure of the AMS through confirmatory factor analysis, to assess the reliability (internal consistency and temporal stability) of the AMS subscales, and to assess whether the original results from the Vallerand, Blais, Briere, and Pelletier (1989) study that concluded that females reported higher levels of intrinsic motivation but lower levels of amotivation than males would be replicated with a population of English-speaking students (Vallerand et al., 1992).

Seven-hundred-forty-five university students from the province of Ontario completed the instrument (484 females and 261 males with a mean age of 21.0 years). In order to assess AMS stability over time, an additional sample of 57 university students

(27 males and 30 females; average age of 19.3) completed the AMS twice over a one-month period. Students were informed that the purpose of the study was to obtain a better understanding of the reasons why they go to the university. Results revealed that the AMS has adequate levels of reliability and factorial validity, very much in line with those of the original French-Canadian versions. Results from the study revealed that the internal consistency of all subscales was adequate (in the .80s). Finally, the AMS demonstrated acceptable levels of temporal stability with a mean test-retest correlation value of .79 over a one-month period. Overall, the findings replicated the results obtained with the French-Canadian version.

An additional study was conducted by Vallerand et al. (1993) that tested the concurrent and construct validity of the English version of the AMS. The instrument was completed by 217 junior-college students from the Montreal area, with 107 males and 110 females, with an average age of 18.7 years. In addition to the AMS, the participants completed various additional scales that were determined by the researchers to represent motivation-like constructs. Finally, the students were asked to complete scales measuring various constructs determined by the researchers to represent educational outcomes (concentration in the classroom, positive emotions in the classroom, and academic satisfaction). Students also reported cumulative grades up to this point in junior college as well as future intentions with schooling.

The results of this study revealed that the AMS has adequate levels of concurrent and construct validity, very much in line with those of the original French-Canadian version. Correlations between the AMS subscales and other motivational scales produced findings in line with predictions from self-determination theory. Correlations

between the AMS and various variables deemed to represent motivational consequences were positive and in line with theoretical predictions from cognitive evaluation theory.

Although the above studies deal with general college students, the next study addressed the motivational sources of medical students (the population that is being investigated in the present study). Sobral (2004) conducted her study with a focus on medical students at the University of Brasilia. The researcher used consecutive sampling: approaching every student who registered for the third term within a 4-year timeframe. A total of 297 students (56.6% males, overall average was 20.4 years old, spanning from 17 to 31 years old) filled out the Academic Motivation Scale. Additionally, students indicated whether they tutored their peers, as well as self-reported their grade point averages.

Groups scoring higher in autonomous motivation on the AMS evidenced greater academic success, expressed by repeated tutoring activity and achievement. Low scores in motivation were associated with restricted growth in academic activity. Across a year, the motivation patterns remained fairly stable. Despite the fact that the AMS does not cover medicine-related sources of motivation explicitly, the lack of medical specificity did not undermine the evidence of the impact of the students' general motivational configuration on their learning quests. Autonomous motivation was reported to be associated statistically significantly with their academic performance.

The results of the three studies cited above (Vallerand et al., 1992, 1993; Sobral, 2004) demonstrate the thorough investigations conducted into the validity of the AMS instrument with a variety of populations: university students, junior-college students, and medical students. The wide variety of validity and reliability measures, no study contains

any consideration for social-desirability bias, which is needed to assess whether students are truly reporting their motivational sources.

Social-Desirability Measurement

The previous sections dealt with various methods of reducing social-desirability bias, as well as with methods of measuring educational motivation. In order to fully study the impact of social-desirability bias, the bias itself must be measured. The detailed descriptions as well as validities, reliabilities, typical scores, and previously tested populations are presented below for two instruments used to measure social-desirability bias. In particular, how the Marlowe-Crowne Social-Desirability Scale is utilized in several studies mentioned in this chapter is given as well as the Balanced Inventory of Desirable Reporting (as this is the measurement tool that was used in the present study to assess social-desirability bias).

Marlowe-Crowne Social-Desirability Scale

Several studies described in prior sections (Fisher, 1998; Fisher & Katz, 2000, Fisher & Tellis, 1998; Hui, 2001) used the Marlowe-Crowne Social-Desirability Scale (MCSD) to estimate the social-desirability bias in their experiments. Therefore, a brief overview of this measurement scale is presented here. The MCSD is a 33-item measure that assesses response bias (i.e., the degree to which individuals attempt to present themselves in a favorable light. Although Crowne and Marlowe (1960) originally constructed the MCSD to be a measure of social-desirability bias in self-reports, their subsequent research on the construct convinced them that the scale was tapping a more general motive: they dubbed it “need for approval” (Crowne & Marlow, 1964). Later, Crowne (1979) refined the concept to be an avoidance of disapproval.

The focus of the MCSD is on ordinary personal and interpersonal behaviors. Fifty such items were assembled and reduced to 33 by item analyses and ratings of experienced judges. The 33 final items describe either (a) desirable but uncommon behaviors (e.g., admitting mistakes) or (b) undesirable but common behaviors (e.g., gossiping). Respondents are asked to respond “true” or “false” to 18 items keyed in the true direction and 15 in the false direction. Hence, scores range from 0 to 33, with higher scores representing higher need for approval (Paulhus, 1991).

The MCSD continues to sustain a dual experience as a social-desirability bias scale and a measure for approval-dependent personality. Both interpretations are consistent with analyses showing the scale taps predominantly the second factor of social-desirability bias, that is, impression management (Paulhus, 1986). More controversial is the question of whether high MCSD scores predict a proneness to dissimulation. A study conducted by Kiecolt-Glaser and Murray (1980) showed that, after an assertiveness training program, high MCSD scorers rate themselves as more assertive than low scorers, although the program trainers rated them as less assertive.

A complicating factor in interpreting certain studies is that, according to their spouses, high MCSD scorers actually do possess such desirable qualities as good adjustment, friendliness, and openness to experience (McCrae & Costa, 1983). Nonetheless, correlations in the study suggest that high MCSD scorers may further exaggerate their claims to such good qualities. A further complication is that high MCSD scorers also possess an honest demeanor; that is, judges tend to believe them and trust them even when they are instructed to lie (Riggio, Salinas, & Tucker, 1988). Indeed, there is some evidence for a self-deceptive component (Millham & Kellogg, 1980).

The Marlowe-Crowne Social-Desirability scale is a tool that has been well-tested and validated through years of research. The above-presented information provides a general overview for one of the most used and influential tests in measuring social-desirability bias. The present study used a similar test (the detailed information for which is given below) in order to measure social-desirability bias.

Balanced Inventory of Desirable Responding (BIDR)

The BIDR is a descendant of the Self- and Other-Deception Questionnaires developed by Sackeim and Gur (1978) who had proposed the division of the traditional social-desirability concept into “other” (or conscious) deception and “self” (or unconscious) deception. Paulhus (1986) recognized the need for refined measures of these concepts and presented empirical support for his two-scale BIDR based on a model of two separate dimensions, impression management (IM) and self-deceptive enhancement (SDE, Lanyon & Carle, 2007).

The impression management items were developed rationally on the assumption that some respondents systematically over report their performance of a wide variety of desirable behaviors and underreport undesirable behaviors. Because the claims involve overt behaviors (e.g., I always pick up my litter), any distortion is presumably a conscious lie. The 40 BIDR items are stated as propositions. The scoring key is balanced. After reversing the negatively keyed items, one point is added for each extreme response (6 or 7). Hence, total scores on SDE and IM can range from 0 to 20. This scoring ensures that high scores are attained only by individuals who give exaggeratedly desirable responses.

Li and Bagger (2007) conducted a reliability generalization study to examine the typical reliability coefficients of BIDR scores and explored factors that explained the variability estimates across studies. Both computer-based and manual searches of studies using the BIDR were conducted. The computer-based search included three steps. First, the researchers conducted a search in the Social Science Citation Index that referenced the book chapter by Paulhus (1991) in which the scale was published. Second, the researchers conducted a search in the PsycInfo and ERIC databases using the search term *Balanced Inventory of Desirable Responding* or *BIDR*. In the third step, the researchers searched unpublished dissertations in the Dissertation Abstract. The articles found covered the time span between 1991 and 2004. Out of the 236 articles, 206 were published studies and 30 dissertations. Of the 236 articles, 86 (36%) did not mention the issue of reliability, 40 (17%) cited the reliability coefficients of other published works, and 110 (47%) reported the reliability estimates of the sample data. The study focused on the 110 articles in which the reliability estimates of test scores were reported. Because some of these articles reported the reliability coefficients of more than one sample, the number of reliability estimates totaled 215. All estimates were measures of internal consistency (Cronbach's coefficient alpha).

To understand the source of variability in reliability estimates, the researchers examined each article and coded the characteristics of the sample. The sample characteristics of age, gender, sample type, nationality, sample size, and language were included in the analysis. Age was coded as a continuous variable representing the mean age of the sample. Gender was coded as a continuous variable representing the percentage of female participants in each sample. Because most of the study participants

were undergraduate students, sample type was coded 1 for undergraduate students and 0 for others. A noticeable number of studies in the database were conducted in countries other than the United States; therefore, nationality also was included as a sample characteristic. Studies conducted in the United States were coded 1, and else were coded 0. The language of the BIDR was also coded, with 1 representing the English version and 0 for versions translated into other languages. In addition to sample characteristics, the researchers also included three test-related predictors: test length (1 for full length and 0 for shortened), publication status (1 for published 0 for unpublished), and scoring method (1 for dichotomous and 0 for continuous).

The mean reliability coefficient of the IM scale was .74 ($SD = .09$, $n = 107$). The mean reliability coefficients were .68 ($SD = .09$, $n = 90$) for SDE scores and .80 ($SD = .04$, $n = 18$) for overall BIDR scores. The results of the paired-samples t test indicated that the score reliability for the IM scale was statistically significantly higher than for the SDE scale ($t = 6.74$, $d = .93$). Exploring the test characteristics that predict the variability of reliability estimates, test length was the only characteristic that was statistically significantly correlated with reliability coefficients ($r = .22$), with the full-length versions associated with higher reliability estimates.

Li and Bagger (2007) also conducted multiple regression analyses, with reliability coefficients entered as criteria and study characteristics as predictors. Given that the regression equations included multiple independent variables, they computed the variance inflation factor to detect multicollinearity. The results indicated that all the variance inflation factors were greater than .5, which indicated that multicollinearity did not bias the standard errors. The resulting equation was statistically significant, $F(8, 88) = 2.82$,

and accounted for 20.4% (R^2) of the overall variation associated with the reliability estimates. Calculating the correlations between study characteristics and reported reliability coefficients of SDE scores, both language ($r = .33$) and country ($r = .28$) were statistically significantly correlated with reliability coefficients, indicating that the SDE scale that was administered in English and in the United States tended to have higher score reliability estimates. Additionally, publication status was statistically significantly correlated with reliability estimates ($r = .21$), with higher reliability estimates reported in published studies.

Lanyon and Carle (2007) used both forensic and undergraduate participants to examine the relationship of the SDE and IM scales, to examine the fit of a two-factor model for the individual items, and to obtain validity correlates. Seven different sets of data were employed in this study, involving a total of 519 participants in five different groups. The first forensic group ($n = 128$) were clients who had been evaluated within a forensic context for one of a variety of purposes, including child-custody issues, personal injury litigation, sex offences, and other criminal offenses. There were 86 men and 42 women, mean age was 33 years and mean education level was 13 years. All participants assigned to this group completed MMPI, BIDR, and the Psychological Screening Inventory (PSI) at a single sitting. The second forensic group ($n = 72$) were patients with personal injury, workers' compensation, or personal-injury claims. Most had a claimed physical disorder or injury. All had been formally examined in a psychiatric clinic in order to determine the presence and extent of psychiatric and psychological difficulties and their relationship to the claimed disability. This group completed the MMPI and BIDR scales. Additionally, 50 of the participants completed the SCT-75 Sentence

Completion (SCT-75) test. The third forensic group ($n = 101$) came from the same source as the second group, but data were gathered in a different year. There were 57 men and 44 women, mean age was 44 and mean education level was 14. Most claimed a disabling psychological condition. All completed the MMPI, the PDS (Paulhus Deception Scale), and the SCT-75.

The study also included two undergraduate groups. The first undergraduate group ($n = 103$) took part in the study to fulfill a course requirement. They completed the BIDR, the PDS, and the PSI. This group completed the BIDR and the PDS one week apart. The second undergraduate group ($n = 115$) completed the BIDR, the PDS, the Good Impression (Gi) scale of the California Psychological Inventory, the Motivational Distortion (MD), and Faking-Bad (FB) scales of the Sixteen Personality Factors Questionnaire, as well as the Desirability (Dy) scale of the Personality Research Form. This group completed the BIDR and the PDS at the beginning and end of a one-hour testing period.

For the BIDR in the forensic groups (Group 1 and 2), the correlations between SDE and IM were .48 and .58, respectively. For the forensic Group 3, the correlation was .47. For the undergraduate groups (Group 4 and 5), the correlations were .53 and .30, respectively. The weighted average of the three correlations involving the forensic groups was .50 and for the three correlations involving undergraduates was .35. The difference is statistically significant, showing a stronger relationship for the SDE and IM scales in forensic than undergraduate participants.

As a general hypothesis, Lanyon and Carle (2007) anticipated that the correlations of IM with the validity scales selected to assess exaggeration of virtue would be

numerically greater than the correlation of SDE with these scales. Conversely, SDE was expected to show numerically higher correlations than IM with the validity scales selected to assess exaggeration of good or poor adjustment. In regard to criterion measures of general social desirability, it was predicted that SDE and IM would show comparable correlates with these measures. For each of the five participant groups, correlations were computed between scores on the BIDR scales and the particular concurrent validation scales.

For exaggeration of virtue, all but 1 of the 19 correlations of IM with other measures of extreme virtue were positive. The average was .52: .50 for forensic groups and .48 for undergraduates. The average correlation of SDE with the concurrent validity measures of exaggerated virtue was .37, statistically significantly less than the average for IM correlations. These data indicate that the IM scale is a satisfactory measure of exaggerated virtue (and is better than SDE) for forensic clients and also for undergraduates but also reflects the fact that SDE overlaps somewhat with IM in assessing exaggerated virtue.

Of the 24 correlations of SDE with measured of exaggerated good or poor adjustment, the average was .39: .42 for forensic groups and .35 for undergraduates. The average correlation of the IM scales with the concurrent validity measures of exaggerated good or poor adjustment was .30, which did not differ statistically from the average for SDE correlations. The SDE correlations were nearly all numerically higher than those for IM for undergraduates but not for forensic clients. These data indicate that SDE is a satisfactory measure of the exaggeration of good or poor adjustment, in particular for forensic clients.

The BIDR questionnaire tool is intended for use in various populations, as demonstrated above. Furthermore, the scale separates two components of social-desirability bias, impression management and self-deceptive management for individual analysis. This questionnaire was used in the present study to assess social-desirability bias independently from the different answers provided by students when answering direct and indirect questions. The information on prior uses of this measurement tool as well as tested validity and reliability information presented in this section demonstrates that the use of BIDR in the present study is acceptable and appropriate.

Summary

The review of the literature presented in this study provided a detailed overview of various methods for assessing and reducing social-desirability bias. The bias was demonstrated clearly by Phillips and Clancy (1972) by asking respondents to rate themselves in the happiness of their marriage (among other factors) as well as to rate how desirable such a trait is. The clear pattern of individuals scoring themselves higher on qualities they ranked desirable establishes the problems of taking self-reported questionnaire or interview answers at face value. Singer et al. (1992) demonstrated that detailed assurances of anonymity reduced the percentage of people approached that agreed to participate in a study and increased the participant assumption that questions asked would be of sensitive nature. Therefore, reducing social-desirability bias in the present study will require either a complete omission or a very brief and general description of confidentiality.

Booth-Kewley et al. in 1992 as well as in 2007 came to opposite conclusions regarding the reduction of social-desirability bias using a computer-administered (as

opposed to paper-and-pencil-administered) questionnaire. The present study will use a paper-and-pencil format because of the inconclusiveness of the findings.

Fisher (1993), Jo et al. (1997), Hui (2001), and Fisher and Tellis (1998) demonstrated that asking students indirect questions reduces social-desirability bias. While answering these questions, the students indeed project their own attitudes when asked to predict how an “average college student” might respond to a particular question. Furthermore, asking indirect questions reduces social-desirability bias more effectively than deriving “true” attitudes by factoring out responses to social-desirability-bias measurement tools such as the Marlowe-Crowne Desirability Scale (Crowne & Marlowe, 1960). In fact, the Marlowe-Crowne scale does not measure social-desirability bias – instead, it measures “need for approval” or “avoidance of disapproval.” Although it has its limitations in potentially tipping a participant off to the true purpose of the study (Jo, 2000), there exists validity and reliability evidence for the Balanced Inventory of Desirable Responding (Paulhus, 1986). The present study used the combination of direct and indirect questions to measure social-desirability bias in combination with using the BIDR tool to compare how well indirect questions reduce social-desirability bias in respondents.

Three studies presented (Vallerand et al., 1992, 1993; Sobral, 2004) measured validity and reliability of the AMS instrument, either in a college setting or in a medical school, without the acknowledgement or any attempt to measure the social-desirability bias. Students taking the AMS twice in one month (Vallerand et al., 1993) had consistent scores. The present study presented two different versions of the AMS (with direct and with indirect questions) to the same participants.

CHAPTER III

METHODOLOGY

The following chapter provides a detailed review of the procedures and methodology that were employed in order to conduct the study. The purpose of the study was to identify and measure the effect of social-desirability bias on self-reporting of motivational attitudes by adult learners. To carry out the study, students were asked to respond to two versions of a motivational-measurement questionnaire (direct and indirect) as well as to a social-desirability-bias measurement questionnaire. The next few sections address the population who was recruited to participate in the study, the instruments that were used to measure motivational sources as well as the social-desirability bias, the procedure that was utilized to conduct the study, and the data analysis.

Research Design

In order to investigate whether there is social-desirability bias in the Academic Motivation Scale (AMS), this instrument was administered along with the Balanced Inventory of Desirable Responding (BIDR), which is composed of two subscales--Self-Deception Enhancement and Impression Management, and an indirect measure of AMS that may reduce social-desirability bias. The two versions of the same motivational attitudes questionnaire were administered in a counter-balanced design. One version of the questionnaire contained questions that pertain to the student him- or herself and asked to answer questions about reasons behind student attending school. Another version of the same questionnaire was modified to contain questions that pertain to all students in the class and asked the student to think about reasons why other students in his or her class are attending school. The latter version was employed to investigate whether it

would reduce social-desirability bias. Students took both versions of the questionnaire, with one group taking the nonmodified questionnaire first (containing direct questions) followed by the modified questionnaire (containing indirect questions), whereas the second group reversed the order in which they took the two instruments. Between taking the two instruments, the students filled out the BIDR.

First, a comparison was made between same two versions of the AMS for the groups taking the two different orders to assess whether there is an order effect. If there were no order effects, then the two versions of the AMS were correlated with the BIDR to assess the extent of social desirability in each version, which indicates the extent of social-desirability bias. Finally, scores on the two versions of the AMS were compared to assess extent of differences in the method of responding and possible reduction in social-desirability bias. There was one independent variable in this study: the order of the AMS questionnaires with two levels: direct first followed by the indirect and vice versa. The dependent variables were the 4 scales of intrinsic motivation, 4 scales of extrinsic motivation, one scale of amotivation, self-deception, and impression management.

Setting

The setting in which this study was conducted is a private state-certified Licensure Vocational Nursing (LVN) accreditation program in Northern California. The selected school had 3 open branches throughout the greater San Francisco Bay Area and provides a variety of certifications to its students beyond the LVN certification. The school faculty was a mixture of full-time and part-time instructors.

Sample

The overall enrollment at the school was around 150 students. Thirty-five percent of the students received some sort of financial aid from the state or federal government in the form of loans or grants. The population that this study explored is the adult learner enrolled in an institution of higher education. Convenience sampling was used.

Approximately 150 adult students (over the age of 18 with the minimal educational level of High-School diploma or General Educational Development GED) test enrolled at a private state-certified Licensure Vocational Nurse accreditation program (regardless of whether they are first, second, third, or fourth semester of the accreditation program) in Northern California were chosen to conduct the survey.

The majority of the students are female (75%), students ranged in age from 24 to 47 years old, with the average age of 32 years old. Forty-seven percent of the students identified themselves as European-American, 24% as Asian-American (including Philipino), 11% as African-American, and 18% as Other. Forty-eight percent of students had a high-school diploma or equivalent only. Twenty-three percent of the students had an Associate degree, 28% of the students had a Bachelor's degree (15% in Biology or related science and 13% in other areas), and one percent of the students have a Master's degree. The majority of the students (68%) were native English speakers. All students were approached and asked to participate in the study.

Protection of Human Subjects

Human-subject consideration was addressed by applying for Institutional Review Board approval at University of San Francisco. Research was governed by the ethical principles and standards as set out by the American Psychological Association (2002).

Study respondent confidentiality was maintained at all times by not asking students to provide their identifying information, including demographic information. Security of the data was maintained throughout the study by the researcher; all raw data were kept under lock and key, and no identifying information was presented in the published study results.

During the recruitment process, participants were informed that the purpose of study is to help understand why students attend school. Although this is not the *literal* purpose of the study, which is to assess social-desirability bias, revealing the true purpose of the study had the potential to compromise the validity and honesty of the responses. At the same time, the participants were informed of the expected involvement of the participant. The entire study participation expected of the participants consists of filling out two 28-question questionnaires (the direct and indirect versions of the AMS) as well as one 40-question questionnaire (the BIDR), which took approximately one hour. Participation was voluntary, and each participant was informed that he or she may withdraw at any time during the study. In order to protect anonymity, participants' names were not collected. Instead, the single identifier was whether the participant filled out the direct or the indirect questionnaire first. All students completed the BIDR questionnaire between the two version of the AMS. The questionnaire administration took place inside a classroom, so a signed permission form (Appendix A) was procured from each of the instructors whose classes was used in the study.

Research Instrument

There are two research instruments that were used in this study (direct and indirect questionnaires) to measure social-desirability bias in motivational self-reporting

(AMS) as well as one research instrument meant to measure two aspects of social-desirability bias independent of context (BIDR). Both versions of the AMS instrument were derived from a single measurement tool, called the Academic Motivation Scale (AMS; Vallerand et al., 1992).

The AMS is a 28-item measure that provides measurements on nine subscales that are classified as intrinsic motivation to know, intrinsic motivation toward accomplishment, intrinsic motivation to experience stimulation, intrinsic motivation, extrinsic motivation identified regulation, extrinsic motivation introjected regulation, extrinsic motivation external regulation, extrinsic motivation, and amotivation. Students responded to each item by indicating on a scale of 1 to 7 how strongly statements correspond to the reasons that they, themselves, attend school. Means for intrinsic motivation, extrinsic motivation, and amotivation were calculated using data from the AMS according to the method described by Vallerand et al. (1992). Some items had to be reverse scored on the subscales in order to calculate an overall metric for each one of the scales. Participants can possibly have means between 1 and 7 on each of the three subscales, with value of 1 indicating less of the type of motivation measured and value of 7 indicating more of the type of motivation measured.

The questionnaire asked students to think about why they attend school. Sample items for intrinsic, extrinsic, and amotivation include, “I go to school because I experience pleasure and satisfaction while learning new things,” “I go to school in order to obtain a more prestigious job later on,” and “Honestly, I don’t know why I go to school; I really feel that I am wasting my time in school,” respectively. Alternatively, the modified (indirect) version of the AMS that also was administered asked participants to

think about other students in their class and why they attend school. Consequently, these items appeared as “They go to school because they experience pleasure and satisfaction while learning new things,” “They go to school in order to obtain a more prestigious job later on,” and “Honestly, they don’t know why they go to school; they really feel that they are wasting their time in school.”

The AMS was developed originally in French in Canada but has been since translated into English and validated with English speakers (Vallerand et al., 1992). The English version of the scale has been shown to have satisfactory internal reliability (Cronbach’s coefficient alpha = .81) and test-retest reliability (mean one-month test-retest correlation = .79) when administered to 745 college students (Vallerand et al., 1992).

Furthermore, research has been conducted with 217 English-speaking Canadian junior-college students to measure concurrent and construct validity. The AMS was compared concurrently with Gottfried’s intrinsic motivation measure. The strongest positive and negative correlations were obtained with the Intrinsic Motivation to Know ($r=.67$) and Amotivation ($r=-.46$). Furthermore, the AMS was compared with the Work Avoidance Scale, where the most positive correlation was with the Amotivation subscale ($r=.26$). The construct validity was assessed by measuring the correlations between the subscales on the AMS. Between the subscales, there was a strong correlation between the three intrinsic motivation subscales (correlation coefficients of .58, .59, and .62). The correlations revealed that the three subscales assess a similar but not identical constructs (Vallerand et al., 1993). For this study, Cronbach’s coefficient alphas were obtained for the 9 scales and are as follows: intrinsic motivation to know (.90), intrinsic motivation toward accomplishment (.78), intrinsic motivation to experience stimulation (.80),

intrinsic motivation (.95), extrinsic motivation identified regulation (.82), extrinsic motivation introjected regulation (.74), extrinsic motivation external regulation (.88), extrinsic motivation (.85), and amotivation (.80).

The Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1986) is a 40-item self-report measure comprised of two 20-item subscales (i.e., self-deception and impression management). Respondents rate their degree of agreement to each statement along 7-point Likert-type scales with one point assigned for each six or seven response subsequent to reversal of negatively keyed items (e.g., "I don't care to know what other people really think of me;" "I have done things that I don't tell other people about" from the self-deception and impression management subscales, respectively). In the present study, the BIDR questionnaire tool demonstrated a good internal reliability with a Cronbach's coefficient alpha of .82 for the overall scale, .62 for SDE, and .82 for IM.

Data Collection

Study participants were assigned randomly to either a "Take Direct Questionnaire First Group" or to a "Take Indirect Questionnaire First Group" as both groups took both of the questionnaires in a different order. The questionnaires were administered during the last hour of class to all students present and willing to participate in the study. The researcher obtained permission from the instructor to conduct the survey during class, and the teacher and researcher agreed on the best date to conduct the study (in terms of work load, test, and vacation schedules, etc.). The instructor consent form is provided in Appendix A. Students had the option of opting out of the survey at will. Those students who chose not to participate in the study were given the option of reading a general article on adult education. In order to fulfill a sample size of around 100 students, the

researcher administered the surveys to all students enrolled in the LVN program, following coordination with each one of the instructors.

The researcher administered the questionnaires to two separate groups of students. Cover letter for the students was read to the students by the researcher and also was included in each student packet (Appendix B). All student groups took all three of the questionnaires; however, one group began with the “Direct Questioning AMS” and ended with the “Indirect Questioning AMS” whereas the second group did the reverse. All groups completed the BIDR between the two AMS questionnaires. The researcher prepared individual student packets containing three questionnaires in individual envelopes numbered 1, 2, or 3. The “Direct Questioning AMS First” group had the “Direct Questioning AMS” marked with “1” and the “Indirect Questioning AMS” was marked with “3.” The Indirect Questioning AMS First” group had the “Indirect Questioning AMS” marked with “1” and the “Direct Questioning AMS” marked with “3.” Each packet also contained the reading material for students who did not wish to participate.

At the end of the class, the researcher explained that the students’ assistance is needed in some research and that the participation is purely voluntary, with absolutely no effect on the grading in the course. The researcher handed out the student packets. Students had 20 minutes for the completion of the survey in envelope #1. Upon the completion of the survey, the students sealed the surveys back into the envelope marked with #1 and set them aside. There was a 5-minute break before students were to begin the completion of the survey in envelope #2 (for all students this was the BIDR questionnaire). Students had 20 minutes to complete this section. Upon the section

completion, the students sealed the surveys back into the envelope marked with #2 and set aside. There was a 5-minute break before students were to begin the last 20-minute segment where they filled out the questionnaires contained in envelopes marked with #3 and passed envelopes with numbers 1, 2, and 3 to the researcher. Students who did not wish to complete the survey had the option to read the article provided in the packet, passing envelopes with blank questionnaires at the end of the survey. All students were free to keep the articles.

Data Analysis

This study was seeking to answer the following research questions:

1. To what extent was there an order effect in the presentation of the two versions of the AMS?
2. To what extent was there social-desirability bias on each of the two versions of the AMS?
3. Which aspect of motivation had the most social-desirability—the three levels of intrinsic motivation, extrinsic motivation, or amotivation? Which aspect had the least?
4. To what extent was there a difference in the social-desirability bias for the two versions of the AMS?

Only those participants who completed all the provided surveys in their entirety were included in the analysis. In order to calculate the extrinsic motivation, intrinsic motivation, and amotivation scores for each one of the participants, an average score for all questions pertaining to that particular motivational scale had to be calculated. To address the first research question, the scores on the subscales for the same versions of the AMS were compared using the independent-samples t test. Because the two groups

were formed randomly, there should have been no difference in the scores on the subscales unless there was a possible order effect of taking one version before the other. If there was no order effect, then the data for the two groups could be combined to address the second and third research questions.

By obtaining correlations between each of the subscales of the two versions of the AMS and the BIDR, the extent of social-desirability bias could be assessed, which addressed the second research question. The magnitude of the correlation coefficients for the 5 subscales indicated the extent of the social-desirability bias. The subscale with the highest correlation coefficient was the one with the greatest social-desirability bias and the one with the lowest correlation coefficient was the one with the least social-desirability bias. This analysis addressed the third research question.

Differences in the magnitude of the correlation coefficients for the 5 subscales of the two versions indicated whether the extent of social-desirability bias was the same for the two versions. A statistical test for differences in dependent correlation coefficients was used to address the fourth research question.

CHAPTER IV

RESULTS

Overall Results

The purpose of this research was to assess the social-desirability bias in a modified version of a widely used and widely accepted motivational self-reporting tool: Academic Motivation Scale (Vallerand et al., 1992). The bias was measured by administering two versions of the AMS: one that contains questions pertaining to the student himself or herself (“direct-questioning”) and one that contains the same questions yet pertaining to *all* students in the class (“indirect-questioning”). Additionally, research study participants filled out the Balanced Inventory of Desirable Responding Questionnaire (BIDR) – an instrument designed to measure two separate dimensions of social-desirability bias: “self-deceptive enhancement” and “impression management.”

The previous chapter described the study design and methodology. Furthermore, it illustrated the method used in this study for selecting the sample and the brief description of the analysis that was used to link the methodology to the research questions for the study. The purpose of this chapter is to present the summarized results and findings of this study. The results are presented in several sections. The first section contains the overall results summary. The subsequent sections present the results as they pertain to the four study questions as they are outlined in the first chapter of this dissertation.

The four research questions investigated in the present study are: 1) To what extent was there an order effect in the presentation of the two versions of the AMS? 2) To what extent was there social-desirability bias on each of the two versions of the AMS? 3) Which aspect of motivation had the most social-desirability—the three levels of intrinsic

motivation, extrinsic motivation, or amotivation? Which aspect had the least? and 4) To what extent was there a difference in the social-desirability bias for the two versions of the AMS? The summary presents a brief synopsis of the results presented in this chapter.

All of the students approached agreed to participate in the study, although not all of them filled out all the questionnaires completely. Out of the 150 study participants (72 participants in the Direct First group and 78 participants in the Indirect First group), 142 participants completed the questionnaires fully (71 participants in the Direct First group and 71 in the Indirect First group). Although 8 individuals did not complete the questionnaire fully, their scale scores were included if they completed that scale. Combining both groups, the means for Intrinsic Motivation were 5.26 for the Direct version of the Academic Motivation Scale and 4.63 for the Indirect version, whereas the means for Extrinsic Motivation were 6.09 for Direct and 5.83 for Indirect (see Tables 1 and 2).

Overall, the means for scales within Intrinsic Motivation ranged from 4.79 (Intrinsic Motivation to Experience Stimulation) to 5.74 (Intrinsic Motivation to Know) for the Direct scores and 4.18 (Intrinsic Motivation to Experience Stimulation) to 5.03 (Intrinsic Motivation to Know) for the Indirect Scores. On the Indirect Motivation scales, the means ranged from 5.47 (Extrinsic Motivation Introjected Regulation) to 6.43 (Extrinsic Motivation Identified Regulation) for the Direct version and from 5.09 (Extrinsic Motivation Introjected Regulation) to 6.33 (Extrinsic Motivation External Regulation). Finally, for the Amotivation scale, respondents' means ranged from 1.79 for the Direct version and 2.53 for the Indirect version of the Academic Motivation Scale measurement tool.

Table 1
Means, Standard Deviations, Sample Sizes and t-test Comparisons of Order for Direct Questionnaire

Direct Measure	Order	n	M	SD	Mean Difference	t	df																																																																																												
Intrinsic Motivation to Know	Direct First	72	5.92	4.24	.32	1.43	147																																																																																												
	Indirect First	77	5.60	6.35				Intrinsic Motivation Toward Accomplishment	Direct First	72	5.36	4.59	.23	0.93	147	Indirect First	77	5.13	6.92	Intrinsic Motivation to Experience Stimulation	Direct First	71	4.91	5.48	.24	0.95	145	Indirect First	76	4.67	6.83	Intrinsic Motivation	Direct First	71	5.39	12.99	.25	1.10	145	Indirect First	76	5.14	19.11	Extrinsic Motivation Identified Regulation	Direct First	72	6.54	2.75	.22	1.60	147	Indirect First	77	6.33	3.68	Extrinsic Motivation Introjected Regulation	Direct First	72	5.72	5.29	.48	1.93	147	Indirect First	77	5.24	6.77	Extrinsic Motivation External Regulation	Direct First	72	6.30	4.06	-.15	-1.00	147	Indirect First	77	6.46	3.55	Extrinsic Motivation	Direct First	72	6.19	9.46	.18	1.27	147	Indirect First	77	6.01	11.10	Amotivation	Direct First	71	1.84	5.02	.10	0.48	145
Intrinsic Motivation Toward Accomplishment	Direct First	72	5.36	4.59	.23	0.93	147																																																																																												
	Indirect First	77	5.13	6.92				Intrinsic Motivation to Experience Stimulation	Direct First	71	4.91	5.48	.24	0.95	145	Indirect First	76	4.67	6.83	Intrinsic Motivation	Direct First	71	5.39	12.99	.25	1.10	145	Indirect First	76	5.14	19.11	Extrinsic Motivation Identified Regulation	Direct First	72	6.54	2.75	.22	1.60	147	Indirect First	77	6.33	3.68	Extrinsic Motivation Introjected Regulation	Direct First	72	5.72	5.29	.48	1.93	147	Indirect First	77	5.24	6.77	Extrinsic Motivation External Regulation	Direct First	72	6.30	4.06	-.15	-1.00	147	Indirect First	77	6.46	3.55	Extrinsic Motivation	Direct First	72	6.19	9.46	.18	1.27	147	Indirect First	77	6.01	11.10	Amotivation	Direct First	71	1.84	5.02	.10	0.48	145	Indirect First	76	1.74	4.97								
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Amotivation	Direct First	71	1.84	5.02	.10	0.48	145																																																																																												
	Indirect First	76	1.74	4.97																																																																																															

* Statistically significant at .05 level

Table 2
Means, Standard Deviations, Sample Sizes and t-test Comparisons of Order for Indirect Questionnaire

Indirect Measure	Order	n	M	SD	Mean Difference	t	df																																																																																												
Intrinsic Motivation to Know	Direct First	72	5.21	5.27	.35	1.54	147																																																																																												
	Indirect First	77	4.86	5.83				Intrinsic Motivation Toward Accomplishment	Direct First	72	5.02	5.18	.65	2.78	147	Indirect First	77	4.37	6.15	Intrinsic Motivation to Experience Stimulation	Direct First	72	4.47	6.43	.56	2.17	147	Indirect First	77	3.91	6.10	Intrinsic Motivation	Direct First	72	4.90	16.07	.52	2.30	147	Indirect First	77	4.38	17.01	Extrinsic Motivation Identified Regulation	Direct First	72	6.17	4.00	.15	0.93	145	Indirect First	75	6.02	3.50	Extrinsic Motivation Introjected Regulation	Direct First	72	5.35	5.12	.51	2.20	148	Indirect First	78	4.84	6.08	Extrinsic Motivation External Regulation	Direct First	72	6.44	2.97	.21	1.56	147	Indirect First	77	6.23	3.66	Extrinsic Motivation	Direct First	72	5.98	10.31	.30	2.10	145	Indirect First	75	5.68	10.62	Amotivation	Direct First	72	2.64	6.04	.22	0.88	146
Intrinsic Motivation Toward Accomplishment	Direct First	72	5.02	5.18	.65	2.78	147																																																																																												
	Indirect First	77	4.37	6.15				Intrinsic Motivation to Experience Stimulation	Direct First	72	4.47	6.43	.56	2.17	147	Indirect First	77	3.91	6.10	Intrinsic Motivation	Direct First	72	4.90	16.07	.52	2.30	147	Indirect First	77	4.38	17.01	Extrinsic Motivation Identified Regulation	Direct First	72	6.17	4.00	.15	0.93	145	Indirect First	75	6.02	3.50	Extrinsic Motivation Introjected Regulation	Direct First	72	5.35	5.12	.51	2.20	148	Indirect First	78	4.84	6.08	Extrinsic Motivation External Regulation	Direct First	72	6.44	2.97	.21	1.56	147	Indirect First	77	6.23	3.66	Extrinsic Motivation	Direct First	72	5.98	10.31	.30	2.10	145	Indirect First	75	5.68	10.62	Amotivation	Direct First	72	2.64	6.04	.22	0.88	146	Indirect First	76	2.43	5.79								
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Extrinsic Motivation	Direct First	72	5.98	10.31	.30	2.10	145																																																																																												
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	Indirect First	76	2.43	5.79																																																																																															

* Statistically significant at .05 level

Order of Two Versions of AMS Taken

The first research question asked whether there was a statistical difference in the questionnaire results depending on whether the study participants first took the Direct version of the Academic Motivational Scale or the Indirect version of same. The order differences were assessed using the independent-samples t test with control of overall error rate at .05. The assumptions for the test were met, in that the sample size was large for the Central Limit Theory to apply and use the tests. Homogeneity of population variances was statistically significant. Tables 1 and 2 display the results of the comparison. For the Intrinsic Motivation scales as measured by the Direct questionnaire, the mean differences between groups ranged from .23 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = .93$) for Intrinsic Motivation Toward Accomplishment to .32 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = 1.43$) for Intrinsic Motivation To Know, with the Direct First group scoring consistently lower than the Indirect First group. Combining the Intrinsic Motivation scales to get an overall Intrinsic Motivation measure, the mean of Direct First group is .25 ($n_{\text{DirectFirst}} = 71$, $n_{\text{IndirectFirst}} = 76$, $t = 1.10$) lower than the comparable mean score for Indirect First group. Comparing these measures to those obtained by the Indirect questionnaire, the smallest mean difference of .35 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = 1.54$) was observed for Intrinsic Motivation to Know and the largest for Intrinsic Motivation Toward Accomplishment (.65 $n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = 2.78$), with first groups scoring slightly higher than the second groups in both cases. The overall measure of Intrinsic Motivation measured by the Indirect questionnaire was different by .52 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = 2.30$) between the two groups.

For the Extrinsic Motivation Scales, the differences between groups ranged from .15 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = -1.00$) for Extrinsic Motivation External Motivation (with the second group scoring higher than the first) to .48 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = 1.93$) for Extrinsic Motivation Introjected Regulation as measured by the Direct questionnaire. The Indirect questionnaire showed the smallest difference of .15 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 75$, $t = .93$) for Extrinsic Motivation Identified Regulation and the largest difference of .51 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 78$, $t = 2.20$) for Extrinsic Motivation Introjected Regulation. The overall measures for the Extrinsic Motivation had a between-group difference of .18 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 77$, $t = 1.27$) when measured directly, and .30 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 75$, $t = 2.10$) when measured indirectly. Finally, the between-group difference of .10 ($n_{\text{DirectFirst}} = 71$, $n_{\text{IndirectFirst}} = 76$, $t = .48$) was observed for Amotivation when measured directly and of .22 ($n_{\text{DirectFirst}} = 72$, $n_{\text{IndirectFirst}} = 76$, $t = .88$) when measured indirectly.

The results suggest that there were no statistically significant differences in the resulting measures in the order that the questionnaires were taken regardless of the mode of measure (Direct or Indirect). These findings indicate that the first research question should be answered as follows, “There was no statistically significant order effect shown for the sequence in which the Direct and Indirect versions of the Academic Motivation Scale were administered to the study participants.”

Social-Desirability Bias In Two Versions of AMS

The second research question asked to measure the extent to which there was social-desirability bias in the original (unaltered) version of the Academic Motivational Scale with direct questioning. With the research presented in literature review (Fisher,

Table 3
Pearson Product-Moment Correlation Coefficients for Difference in Direct and Indirect AMS Scales

Difference	Self-Deception Enhancement	Impression Management	Social Desirability
Intrinsic Motivation to Know	.07	-.02	.03
Intrinsic Motivation Toward Accomplishment	.03	-.01	.01
Intrinsic Motivation to Experience Stimulation	.16	.08	.14
Intrinsic Motivation	.10	.02	.07
Extrinsic Motivation Identified Regulation	.05	-.03	.01
Extrinsic Motivation Introjected Regulation	.04	-.10	-.04
Extrinsic Motivation External Regulation	-.02	-.01	-.02
Extrinsic Motivation	.03	-.08	-.03
Amotivation	-.08	.05	-.02

Table 4
Pearson Product-Moment Correlation Coefficients for BIDR Scales

BIDR Scale	Self-Deception Enhancement	Impression Management	Social Desirability
Self-Deceptive Enhancement	1.00	.40	.83
Impression Management	.40	1.00	.84
Social-Desirability Bias	.83	.84	1.00

1993) stating that asking questions indirectly reduces social-desirability bias, the difference in responses given by the study participants ranking him- or herself (rife with social-desirability bias) and the responses given by the study participants ranking his or her peers (free of social-desirability bias) for the same motivational-measurement scales should represent social-desirability bias. In order to answer this research question, a correlation analysis was performed between the Direct-Indirect differences in responses for each of the AMS-measured scales with each of the BIDR-measured scales. The results are presented in Table 3. Each line in the table represents the differences in responses on the same scales between the Direct and Indirect questionnaires and the correlations with each of the subscales as well as the overall social-desirability bias measure on the BIDR questionnaire. Furthermore, Table 4 presents the Pearson Product-Moment Correlation Coefficients between each individual scale on the BIDR questionnaire and the overall measure of social-desirability bias (the combination of the Impression Management and Self-Deception Enhancement scales).

The correlation between Self-Deceptive Enhancement and Impression-Management is .40, suggesting that the BIDR tool indeed measures two distinct components of social-desirability bias. The correlations between the individual scales and the overall social-desirability bias measurement (combination of the two scales) are .83 for Self-Deception Enhancement and .84 for Impression Management. The strongest correlation between Direct-Indirect score differences and Self-Deceptive Enhancement is for Intrinsic Motivation to Experience Stimulation ($r = .16$), which is a weak correlation. The weakest correlation is for Amotivation ($r = -.08$), which is a weak correlation.

Extrinsic Motivation External Regulation and Amotivation are the only scales that are negatively-correlated with Self-Deception Enhancement.

The strongest-correlated AMS scale with Impression Management is Intrinsic Motivation to Experience Motivation ($r = .08$), which is a weak correlation. The weakest correlations with Impression Management are Intrinsic Motivation Toward Accomplishment ($r = -.01$) and Extrinsic Motivation External Regulation ($r = -.01$), which are both very weak correlations. Besides Extrinsic Motivation External Regulation and Intrinsic Motivation Toward Accomplishment, the other negatively-correlated AMS scales with Impression Management are Intrinsic Motivation to Know ($r = -.02$), Extrinsic Motivation Identified Regulation ($r = -.03$), Extrinsic Motivation Introjected Regulation ($r = -.10$), and Extrinsic Motivation ($r = -.08$).

When measuring the correlation between any scale on the Academic Motivational Scale and total Social-Desirability Bias (measured by combining the scores on Self-Deception Enhancement and Impression Management), the strongest-correlated AMS scale is Intrinsic Motivation to Experience Stimulation ($r = .14$), a weak correlation. The weakest-correlated AMS scales to the total social-desirability bias measure are Intrinsic Motivation Toward Accomplishment ($r = .01$) and Extrinsic Motivation Identified Regulation ($r = .01$), which are both weak correlations. The four negatively-correlated scales were Extrinsic Motivation Introjected Regulation ($r = -.04$), Extrinsic Motivation External Regulation ($r = -.02$), Extrinsic Motivation ($r = -.03$), and Amotivation ($r = -.02$), correlations which are all close to zero.

The results suggest that there are extremely weak correlations between any measures on the BIDR and any measures on the AMS, regardless of measurement mode

(direct or indirect). Consequently, the answer to the second study question is that there is no statistically significant social-desirability bias as measured by the difference in responses given on the Direct and Indirect versions of the Academic Motivational Scale.

AMS Motivational Scales' Social-Desirability Bias

The third study question asks which AMS motivational scales have the most social-desirability bias. As shown in the second question, none of the correlations between the AMS measures and the BIDR measures produced any statistically significant correlations. This fact means that no motivational measures, regardless of the mode of measure had any statistically significant correlation with social-desirability bias.

Differences in Responses on AMS

The final research question posed for this study asked to measure the extent of the difference in the social-desirability bias for the two versions of the AMS. The results of the analysis are reported in Table 5. The two versions were compared using the dependent-sample t test when error rate was controlled at .05. The assumption of normality of distribution was not a concern as the sample size was large enough for the Central Limit Theorem to apply. Consistent with the results reported by Fisher (1993), respondents answered the questions about themselves differently than they did when they were asked to rate others. When measuring themselves on their own Intrinsic Motivation to Know, on average, students ranked themselves .72 points, on average, higher (SD = 5.08, $t = 6.86$) than when asked to rank their peers on the same measure. The motivational scale of IM To Know produced the largest difference between the Direct and Indirect versions of the AMS.

Table 5

Means, Standard Deviations, t-test Results, df, and Practical Importance for Comparison of Direct-Indirect AMS Motivational Scales

Scales	Direct Mean	Indirect Mean	Mean Diff	Standard Error Mean	t	df	Effect Size**
Intrinsic Motivation to Know	5.74	5.03	.72	.10	6.86*	147	.56
Intrinsic Motivation Toward Accomplishment	5.24	4.70	.54	.11	4.59*	147	.38
Intrinsic Motivation to Experience Stimulation	4.79	4.18	.61	.12	5.44*	145	.45
Intrinsic Motivation	5.26	4.63	.63	.09	6.42*	145	.53
Extrinsic Motivation Identified Regulation	6.43	6.09	.34	.06	5.37*	145	.44
Extrinsic Motivation Introjected Regulation	5.47	5.09	.39	.12	3.37*	148	.28
Extrinsic Motivation External Regulation	6.38	6.33	.05	.10	0.61	147	
Extrinsic Motivation	6.09	5.83	.26	.07	3.86*	145	.32
Amotivation	1.79	2.53	-.75	.11	-7.05*	145	-.58

* Statistically significant when overall error is controlled at the .05 level

** A effect size was computed by dividing mean difference by standard deviation

Students ranked themselves .54 points, on average, higher (SD = 5.70, $t = 4.59$) when asked questions measuring their Intrinsic Motivation Toward Accomplishment, .61 points, on average, higher (SD = 5.42, $t = 5.44$) when asked questions that measured Intrinsic Motivation to Experience Stimulation, and .63 points higher (SD = 14.25, $t = 6.42$) on their overall Intrinsic Motivation. When asked to rate themselves on Extrinsic Motivation, students ranked themselves .34 points, on average, higher than their peers (SD = 3.04, $t = 5.37$) on Extrinsic Motivation Identified Regulation and .39, on average, points higher (SD = 5.63, $t = 3.37$) on Extrinsic Motivation Introjected Regulation. Furthermore, students ranked themselves .75 (SD = 5.09, $t = -7.05$) points *lower*, on average, than they ranked their peers on the amotivation scale (i.e. they judged their peers to be more amotivated than they judged themselves). The single scale where the difference in measurement between Direct and Indirect versions of the questionnaire was not statistically significant on Indirect Extrinsic Motivation External Regulation (.05, SD = .32, $t = .61$). However, this result is also not statistically significant. The effect sizes were large for all statistically significant scales except for Extrinsic Motivation Introjected Regulation.

These results suggest that indeed, students do answer questions about themselves differently – indicating that they are far more intrinsically motivated than their peers by .63 points, that they are slightly more extrinsically motivated than their peers by .26 points, and that they are much less amotivated than their peers by .75 points.

Summary

This chapter presented the main findings of the study and addressed the four main study questions. The first finding addressed whether the order in which the questionnaires

were administered produced a difference in the results. The data showed that there was no difference between the groups on any of the measurement scales. The second question asked whether there was a correlation between social-desirability bias as measured by the Balanced Inventory of Desirable Reporting and the Academic Motivational Scale. The data showed that there was no statistically significant correlations between the differences in Direct and Indirect responses to the AMS on any of the scales measured by the AMS and any of the scales measured by BIDR. The third question was a corollary to the second question, asking which components of the Academic Motivational Scale had the most social-desirability bias. Because the second question found no relationship between the scales, the answer to the third question is that all scales on the AMS are equally noncorrelated with the social-desirability bias as measured by BIDR. The final question addressed the differences between the answers given by respondents when asked to evaluate themselves (Direct measurement) and the answers given when asked to evaluate their peers (Indirect Measurement). The analysis shows that there is indeed a difference between how students evaluated themselves (more intrinsically motivated, more extrinsically motivated, and less amotivated).

CHAPTER V

DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

The purpose of this research was to assess the social-desirability bias in a modified version of a widely used and widely accepted motivational self-reporting tool: Academic Motivation Scale (AMS; Vallerand et al., 1992). The bias was measured by administering two versions of the AMS: one that contains questions pertaining to the student himself or herself (“direct-questioning”) and one that contains the same questions yet pertains to *all* students in the class (“indirect-questioning”). Additionally, research study participants filled out the Balanced Inventory of Desirable Responding Questionnaire (BIDR) – an instrument designed to measure two separate dimensions of social-desirability bias: “self-deceptive enhancement” and “impression management.”

Whereas the prior chapters explored the problems of motivation and social-desirability bias in detail, described the design of the study to ascertain social-desirability bias in motivational self-reporting, and reported the results, this final chapter is a discussion of these findings. As with the Results chapter, the discussion will be according to the study questions, which were presented in the introductory chapter. Once the results are discussed, several options for applying these findings to the practice of education, suggestions for future research, the limitations of the study, and overall conclusions will be provided.

Summary

The present research attempted to ascertain how truthful students were when responding to questions about the source of their motivation for attending school. Motivational sources were postulated to be susceptible to social-desirability bias, defined as the concept of reporting more socially acceptable results either consciously or

subconsciously to make a better impression on the researcher or to deceive the respondent him- or herself. Prior research showed that one of the effective methods of reducing social-desirability bias is to ask respondents indirect questions (i.e., questions that ask participants to respond on the behavior and attitudes of their peers as opposed to responding on their own behaviors and attitudes). Furthermore, prior research demonstrated that the Academic Motivational Scale is a reliable and valid measure of motivational sources, whereas the Balanced Inventory of Desirable Responding is a reliable and valid mode of social-desirability bias measurement.

The sample of participants who participated in the study was Licensure Vocational Nursing students enrolled in a private school in Northern California. Close to 150 students were randomly split into two groups, with one group taking the Direct version of the Academic Motivational Scale (i.e., unaltered version asking students to rate their own motivations) first and the Indirect version of the Academic Motivational Scale (i.e., altered version with all questions modified to ask students to rate their peers' motivations) second, and the second group reversing the order. Both groups took the Balanced Inventory of Desirable Responding between the two versions of the Academic Motivation Scale.

The results indicated that there was no statistically significant difference between the Direct First and the Indirect First groups. The social-desirability bias as measured by the difference in direct and indirect versions of the AMS, however, was not statistically significantly correlated with social-desirability bias as measured by the BIDR. The results did indicate that students ranked themselves as more intrinsically-motivated,

extrinsically-motivated, and less amotivated than their peers to a statistically significant degree.

Limitations

The study conducted herein attempted to compare two distinct methods of measuring motivational factors within the same adult student population and to measure social-desirability bias in a traditional self-reporting questionnaire. This study design carried with it several limitations. First, although research (Fisher, 1993) indicated that asking indirect questions lowers social-desirability bias, it is possible that some social-desirability bias may have still existed. Furthermore, asking students to alternate between answering the questions as themselves and then answering the same questions as other students in their class may have been confusing.

As discussed in the review of the literature, there are a number of tools to measure social-desirability bias, besides the Balanced Inventory of Desirable Responding (BIDR) questionnaire that was used in the present study. For instance, the Fisher and Tellis (1998) study utilized the Marlowe-Crowne Scale of Desirability (MCSD). The results of the present study may mean that social-desirability bias as measured by BIDR does not correlate with the social-desirability bias as measured by the AMS whereas the same correlations could be more statistically significant when using the MCSD. Moreover, the AMS results were shown to be stable if taken twice in the course of a year (Sobral, 2004). The current study asked the respondents to take two virtually identical questionnaires one after another, which may have impacted the results of the study. Finally, the sample that was used in this study was far more varied than the samples used in the various social-desirability bias-measurement studies, which used college students enrolled in 4-year

degree programs. The present study used students who ranged in their highest level of education from a high-school diploma (or equivalent) to a Master's degree enrolled in a 2-year program.

Finally, this study did not differentiate between students that were in their first and in their second year of study. It is possible that the students in different stages of their education may have had statistically-significant differences in the responses that they gave as they pertained to their motivational attitudes.

Discussion

This next section provides an in-depth discussion of the results, organized by the four research questions that the study set out to answer.

Order of Two Versions of AMS Taken

The results of the study indicated that there was no difference between the Direct First and Indirect First groups, that is, no order effect. This is a new finding that was not tested in any of the studies using the Direct-Indirect dichotomy method to reduce social-desirability bias. Fisher (1993), Jo, Nelson, and Kiecker (1997), and Fisher and Tellis (1998) all asked respondents direct questions, followed by indirect questions, whereas Harry Hui (2001) first asked respondents to evaluate how others would answer the questions, followed by instructions to rate themselves. A review of literature demonstrated that the Academic Motivational Scale had a test-retest reliability of .79 over a one-month period (Vallerand et al., 1992). It was unknown whether this test-retest would hold up when two slightly-different versions of the questionnaire would be administered one after the other, or if the results differ based on the order in which the tests are taken.

Social-Desirability Bias In Two Versions of AMS

Fisher and Tellis (1998) found that using the Direct-Indirect method to reduce social-desirability bias was a more effective method than adjusting the participants' responses to the direct questions by a factor of their score on an independent social-desirability bias instrument (this study used the Marlowe-Crowne questionnaire). The present research used a different methodology as well as a different social-desirability bias measurement instrument (the Balanced Inventory of Desirable Responding). Instead of adjusting a direct-question answer by the score received on a social-desirability bias score, this study examined the correlation between the score received on the BIDR and the differences between the direct and indirect scores on the AMS.

The rationale for such a methodology was that the difference between direct (rife with social-desirability bias) and indirect (no social-desirability bias) scores should approximate the extent to which the respondent exhibited social-desirability bias. If indeed, indirect questions remove social-desirability bias, then the difference between the two methods of questioning should correlate closely with the results on BIDR.

The calculated results indicated that the Self-Deception Enhancement (SDE) subscale on the BIDR had a low reliability of .40 and that there was no statistically significant correlation between direct-indirect question differences on any of the AMS scales and any of the BIDR scale scores. The data suggest that asking indirect questions may not remove social-desirability bias from the Academic Motivation Scale. This outcome clashes with the conclusions reached by the Fisher (1993), Fisher and Tellis (1998), Jo et al., (1997), and Huy (2001) studies. The present research results could indicate that the Academic Motivational Scale in its unchanged state could contain no (or

very little) social-desirability bias. Alternatively, the results could indicate that motivational attitudes are not susceptible to social-desirability bias.

AMS Motivational Scales' Social-Desirability Bias

This research question was an extension of the previous study question regarding the AMS scale that exhibited the most social-desirability bias. The results discussed in the previous section indicate that there is no social-desirability bias that is statistically significant in any of the AMS-measured scales.

Differences in Responses on AMS

Despite the fact that the differences in direct and indirect question answers did not correlate to responses to the BIDR, there were statistically significant differences between the direct and indirect questions. Specifically, study participants ranked themselves as more intrinsically-motivated, more extrinsically-motivated, and less amotivated than they ranked their peers. These results do seem to exhibit the pattern of students ranking themselves better than a typical student – something that could be interpreted to be social-desirability bias.

Based on the current research, assumptions, and data, although students gave different responses when asked about themselves than when asked about their peers regarding their motivational attitudes, we cannot say that this difference is due to social-desirability bias. Still, these differences in responding call into question the results that are used by researchers – which responses are more valid – when students respond about their own behavior or when they describe others.'

Furthermore, these results may call into question the validity of using 'indirect' questioning as a proxy for the attitudes of the respondent him- or herself, at least in the

context of motivational attitudes and in the context of the AMS questionnaire. The ‘indirect’ method of questioning may be eliciting students to measure their perceptions of other people, rather than their own subconscious perceptions of themselves. While this study’s participants were filling out all the instruments, they may have been relying on their most memorable perceptions of their peers, perhaps with the students least likely to take schooling seriously making the deepest impression. Using the deepest impression to color an overall response is referred to as “availability heuristic” (Fox, 2006). Although the present study was not designed to measure, identify, or isolate the availability heuristic, it may help to explain the results of such different responses when it came to evaluating self from others and the lack of any relationship between this difference and social-desirability bias.

On a related note to the availability heuristic, as mentioned in the ‘Limitations’ section of this chapter, there may have been a statistically significant difference between students in their first and second year of studies. Possibly, students in their second year observed more of their peers dropping out of the program, which would in turn color their perception of their peers as being less motivated than the respondents themselves. The institution at which the present study was conducted, indeed had an average 10% annual attrition rate for students enrolled in the Licensure Vocational Nursing (LVN) course of study.

Implications for Practice

Although the ultimate goal of this research was to identify students’ true motivational reasons for seeking and continuing education – a finding that would have huge implications for the field of education – the results did not provide these answers. In

fact, the study results seem to offer more questions to be researched before implications to practice could be fully realized. The similarities between Direct First and Indirect First groups showed that the method of asking direct questions followed by indirect questions is a valid procedure, despite the fact that it may not remove social-desirability bias. The differences between direct and indirect responses call into question which responses should be used in research studies using the Academic Motivational Scale – the responses given about the respondents' themselves or responses given about the respondents' peers.

Suggestions for Future Research

There are several avenues for future research to proceed. The majority of past research has concentrated on measuring how self-reported motivation using the AMS correlates with students' academic performance. The present study suggests that students view themselves differently from their peers in terms of motivation. Future research could incorporate student's academic performance to evaluate whether there is a relationship between how differently students view themselves from others (in terms of intrinsic motivation, extrinsic motivation, and amotivation) and their academic performance.

Furthermore, future research could incorporate the method described in the literature review developed by Hui (2001) of double-rating and compare how students' scores for themselves and for others change based on researchers' suggestions that some questions are answered to please others. Finally, although this study used the Balanced Inventory for Desirable Reporting in order to measure social-desirability bias, several other instruments exist (e.g., Marlowe-Crowne Social-Desirability Scale; Crowne &

Marlow, 1960). Potential future research could address how these instruments correlate with the Academic Motivational Scale.

Conclusions

Are respondents truthful when they evaluate their own motivational attitudes or are they susceptible to social-desirability bias whereas they either consciously or unconsciously change their responses to fool themselves or the researcher by giving a more socially-desirable response? Prior research indicated that asking indirect questions (where respondents were asked to rate their peers as opposed to themselves) reduced social-desirability bias. This study asked around 150 adult student respondents enrolled in a 2-year Licensure Vocational Nursing program to respond to a motivational-measurement tool, Academic Motivational Scale in two versions.

The students took the original unaltered AMS survey as well as a modified same survey that asked the same questions, but referred to typical students. Additionally, respondents took a social-desirability bias-measurement instrument, Balanced Inventory of Desirable Responding, to ascertain respondents' social-desirability bias. The resulting analysis compared how two student groups (group 1 took the direct questionnaire first followed by the indirect and group 2 took both questionnaires in the opposite order) compared. Data showed that both groups answered similarly, regardless of the order in which the two instruments were taken.

When comparing the difference between direct and indirect versions of the questionnaire, students marked themselves higher intrinsically motivated, higher extrinsically motivated, and lower amotivated than they ranked their peers. These differences, however, did not correlate with social-desirability bias as measured by

BIDR. These results put into question which results of the AMS survey are more truthful (yet equal in social-desirability bias). Furthermore, what accounts for the difference between the two questionnaires, if not social-desirability bias still remains unclear and remains as a possible path for future research.

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APPENDICES

Appendix A

Instructor Permission Letter

Dear Professor _____:

This letter confirms that you have been provided with a brief description of my dissertation research concerning nursing students' motivation for attending school. Your signature below indicates that you agree to allow me access to students enrolled in your course whom I may contact for participation in this study. The students that agree to participate in my research will be given three questionnaires to fill out, asking questions regarding their and their fellow students' reasons for attending school as well as about their personalities. Upon completion of the materials, the students will be asked to return them to me.

I will make every effort to ensure that my data collection causes minimal inconveniences to your and your students' time. Your participation and the participation of your students will be entirely voluntary and results will be kept confidential and anonymous.

After my research project has been completed in late 2008, I will be glad to send you a summary of my research findings and conclusions. Please feel free to contact me if you have any further questions about this project.

Sincerely,

Larisa Revzina
University of San Francisco
School of Education
2130 Fulton Street
San Francisco, CA 94117

Appendix B
Student Instruction Letter

Dear Students:

I am conducting a study on students' reasons for attending school. This research will count toward completion of my doctoral studies in the School of Education at the University of San Francisco. I am asking for your participation in this study because of your enrollment at Gurnick Academy of Medical Arts. Your participation in this study will help educators understand why students attend school.

The study involves voluntary participation in completion of three short questionnaires regarding your reasons for attending school as well as about yourself. Your decision to participate or not participate will in no way affect your status in the Gurnick Academy of Medical Arts or the grade in this course. It will take approximately 1 hour to complete the questionnaire.

Participation in this study is voluntary. If you choose to participate, please fill out the questionnaires, in the order that they are numbered in your packets. You will have twenty minutes to complete each portion of the questionnaire. When you have completed each questionnaire, please seal it back in the provided numbered envelope and pass it to me at the end of the twenty-minute period. Return of the questionnaires to the envelope signifies that you consent to participation in this study. If you choose not to participate, you have a reading about adult education that you may read. If you have additional questions about the study, you may call me or e-mail me. Approval for this study has been obtained from the University of San Francisco Institutional Review Boards. Thank you for your interest in and contribution to my research.

Sincerely,

Larisa Revzina
University of San Francisco
School of Education
2130 Fulton Street
San Francisco, CA 94117

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