

**INDEPENDENT AUDITORS'S WILLINGNESS TO PROVIDE CONTINUOUS  
AUDITING SERVICES: A THEORY OF PLANNED BEHAVIOR APPROACH**

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August 2008

*Research-in-progress – Comments are welcome but please do not cite.*

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## ABSTRACT

Extant research on continuous auditing (CA) has evolved from discussions on how to best audit complex event-driven information systems (Cash et al. 1977, Groomer and Murthy 1989) to a dialog on how the audit profession can move from traditional backward looking to real-time attestation services (Vasarhelyi and Halper 1991, CICA/AICPA 1999, Alles et al. 2002, Rezaee et al. 2002). CA was initially proposed as a service to be provided by external auditors; however, audit firms have been slow to embrace this type of engagement. Some internal audit departments are employing continuous auditing and/or continuous monitoring techniques as part of their overall audit plan (PricewaterhouseCoopers 2006), but currently external audit firms are not employing CA platforms. Thus, the purpose of this study is to identify factors that inhibit external auditors' willingness to provide CA services.

The theory of planned behavior (TPB) is the theoretical lens used to understand factors associated with auditors' willingness to provide CA services (Ajzen and Madden 1986, p. 457; Aizen 1991; Bagozzi 1992). TPB posits that behavior is a function of individuals' willingness to engage in a behavior and that willingness to engage in the behavior is a function of individuals' behavioral attitudes, subjective norm, and perceived behavioral control. In this study, a cross-section of accounting professionals are surveyed regarding their willingness to provide CA services in order to better understand why audit firms are not currently providing CA services. Because the theoretical model employed in this study has latent variables that are both exogenous and endogenous, and reflective indicators are used for three of the latent variables while formative indicators are used for the other two latent variables, partial least squares (PLS) is used for data analysis.

The results of this study will extend prior research that examines the technological feasibility and the effectiveness of continuous auditing for financial reporting, audit quality control, and managing related audit firm business risk. This study complements and extends prior research by providing insight into factors that impact auditors' willingness to provide continuous auditing services. The information gained from this study is useful for developing a more holistic understanding of audit firm CA implementation processes.

**Keywords:** continuous auditing, theory of planned behavior, willingness, enabling resources, business risk management, partial least squares

## **RESEARCH OBJECTIVES/QUESTIONS**

With the advent of sophisticated database management systems, increased technology, enterprise resource planning systems, and the current maturation of the extensible business reporting language (XBRL), continuous, real-time reporting no longer evokes thoughts of science-fiction (Sutton 2000). In 1999, the CICA-AICPA Joint Study Group on Continuous Auditing (p. 12) identified six conditions necessary for CA: “(1) Reliable systems provide the subject matter; (2) Subject matter has suitable characteristics; (3) Highly automated audit procedures can provide most of the audit evidence; (4) High degree of auditor proficiency in IT & audited subject matter; (5) Reliable means of obtaining results of audit procedures on a timely basis; (6) Timely availability of, and control over auditors’ reports.” Over the past few years, these conditions have been satisfied, as is evidenced by internal auditors’ use of continuous auditing and/or continuous monitoring techniques as part of their overall audit plan (PricewaterhouseCoopers 2006). CA was initially envisioned as an external audit function and as a basis for providing real-time assurance over publicly available financial information. While the potential for continuous reporting has existed for several years, external auditors have been slow to embrace providing this service. Thus, the objective of the current study is to identify factors that inhibit external auditors’ willingness to provide CA services.

## **THEORETICAL FOUNDATIONS FOR THE STUDY**

The theory of planned behavior (TPB) provides the theoretical foundation for the current study. TPB is deemed appropriate because it measures the extent of an individual’s intent to engage in a particular behavior (Fishbein and Ajzen 1975); and, in the current study the behavior of interest is CA. TPB has been widely used in both social psychology (e.g., Azjen and Madden 1986, Venkatesh et al 2003) and information systems (e.g., Taylor and Todd 1995; Venkatesh et

al. 2003; and Chau and Hu 2001). TPB asserts that planned behaviors result from behavioral intentions, that behavioral intention is a direct function of behavioral attitude, subjective norms, and perceived behavioral control and, that beliefs regarding “the presence or absence of requisite resources and opportunities” (enabling resources) are the antecedents of perceived behavioral control (Ajzen and Madden 1986, p. 457; Aizen 1991).

Behavioral intention is “a measure of the strength of one’s intention to perform a specified behavior” (Fishbein and Ajzen 1975, p. 288). Ajzen (1991) posits that behavioral intention is a function of individuals’ salient beliefs. However, not all salient beliefs are converted into intentions, because individuals may not intend to engage in a particular behavior even though they believe that the behavior is possible, potentially beneficial, and desired by referent others (e.g. when other more desirable alternatives are available). As shown in Figure 1, Bagozzi (1992, p. 184) posits that “the missing motivational link in the attitude-intention relationship seems to be related to the subjective experience of desiring to perform an action.” Thus, for CA to flourish, independent auditors must be desiring (willing) to provide the service and that this willingness will be a function of independent auditors’ salient beliefs (Figure 2).

Although auditors may hold many beliefs about CA, all of these beliefs will not necessarily influence their willingness to provide CA services. For example, auditors may believe that CA is better suited for performing tests of internal controls rather than substantive testing of transactions. However, this specific belief may not be predictive of auditors’ willingness to provide CA services. As shown in Figure 2, for CA, salient beliefs include the feasibility of providing CA services (perceived behavioral control), firm related issues such as legal liability, cost and staffing (behavioral attitude), and the perceived demand for CA services by referent others (subjective norm).

[Insert Figure 1]

[Insert Figure 2]

### *Perceived Behavioral Control*

Perceived Behavioral Control (PBC) is an assessment of individuals' perceived volitional control (Ajzen 1991). In a CA environment, PBC reflects the extent of auditors' belief that CA is feasible (i.e. within their volitional control) and feasibility in turn is a function of enabling resources, which includes both requisite auditor resources (i.e. auditing procedures and auditor technology infrastructure) as well as requisite client resources (client technology infrastructure) that can facilitate/prevent independent auditors from providing continuous auditing services. As Alles et al. (2006, p. 3) noted:

*“It is one thing for an auditor to choose to avoid obtaining disaggregated data when it is very costly to obtain, and quite another to choose to ignore it when it is readily available. It is the latter situation that the audit profession will increasingly find itself in until auditing procedures and systems are developed that can take advantage of the availability of timely and highly disaggregated data.”*

Client technology is evolving rapidly and although some companies have incorporated technological advances such as XBRL and enterprise resource planning systems that support real-time reporting in their internal reporting models (PriceWaterhouseCoopers 2006), whether independent auditors believe CA is currently feasible remains an empirical question. TPB suggests that independent auditors' assessment of the availability of enabling resources will be positively associated with their beliefs regarding the feasibility of providing CA, which in turn will be positively associated with their willingness to provide CA services, leading to our first hypotheses (Figure 2):

**H1a:** Independent auditors' assessment of enabling resources is positively associated with their perceptions of the feasibility of providing CA services.

**H1b:** Independent auditors' perceptions of the feasibility of providing CA services are positively associated with their willingness to provide CA services.

### *Subjective Norm*

TPB posits that subjective norm is another salient influence on the willingness of independent auditors to provide CA services. Subject norm includes independent auditors' perception of whether their referent others (e.g. clients, investors, regulators, and law makers) will want CA. This suggests that if auditors believe (do not believe) there is a demand for CA they will be more (less) willing to provide this service. Thus, increases in demand for CA are expected to be positively associated with increases in auditors' willingness to provide CA services. However, Alles et al. (2002) caution against assuming there will be a demand for continuous services citing reasons such as management's unwillingness to increase frequency of disclosure and lack of evidence supporting market usage of financial information currently available on a more frequent basis (e.g., quarterly 10-Q vs. annual 10-K reports). Still, the traditional backward looking audit paradigm appears to be shifting. For example, recently, SEC Chairman Christopher Cox (January 14, 2007), released the following statement, in response to a draft taxonomy by the Investment Company Institute (ICI), a mutual fund company, that would allow ICI to communicate more effectively with investors

*"I applaud the ICI and its President, Paul Schott Stevens, for the leadership role they have played in bringing the potential of interactive data closer to reality for mutual fund customers. Completing the taxonomy for the mutual fund risk/return summary means that funds can now make this information available to investors in far more useful ways. Interactive data will transform static figures into dynamic databases that can readily be searched, analyzed, and compared. There is no more important place for application of this tool than mutual funds, where millions of Americans engage in comparison shopping every day. Retail investors rely on mutual funds to finance their retirement, their education, their health care*

*and almost every other need. Today's announcement means they will soon be armed with better, more accessible information on which to base their investment decisions. The SEC will act quickly to facilitate the use of the new taxonomy in Commission filings."*<sup>1</sup>

The above statement indicates that the SEC plans to facilitate the use of tagged data for reporting purposes, and that the SEC supports the idea of tagging information and using a common taxonomy for easy information retrieval and dissemination.

TPB asserts that only perceived behavioral control is a function of external resources that either facilitate or inhibit the desired behavior (Ajzen 1991). However, CA is unique in that perceptions regarding enabling resources can impact independent auditors' perceptions of whether referent others will want CA. For example, independent auditors that believe clients do not have the necessary technology infrastructure to support CA would be expected to assess client demand at a lower level than auditors who believe the enabling technologies are readily available. The preceding discussion is summarized in the following hypotheses and depicted in Figure 2.

**H2a:** Independent auditors' assessment of enabling resources is positively associated with their perceptions of the demand for CA by referent others.

**H2b:** Independent auditors perceptions of the demand for CA by referent others are positively associated with their willingness to provide CA services.

### *Behavioral Attitude*

The attitudinal determinant of a given behavior is the extent to which the person perceives the behavior as favorable or unfavorable, weighted by expected outcomes (e.g. benefits and costs) and consequences as a result of engaging in the behavior (Fishbein and Ajzen 1975;

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<sup>1</sup> <http://www.sec.gov/news/press/2007/2007-2.htm>

Ajzen and Driver 1991; Taylor and Todd 1995). This suggests that behavioral attitudes are positively associated with willingness and behavioral intention to perform a given behavior (Bagozzi 1992). In other words, a person will have a positive affect if they believe that the net result of performance is favorable (Fishbein 1980). For example, the independent auditor may conclude that CA related costs can be more than offset by practice related gains. However, again because enabling resources are so intricately intertwined in the provision of CA services, it is likely that independent auditors' behavioral attitude will reflect their perceptions of enabling resources and be positively associated with their willingness to provide CA services, which leads to the final hypotheses (Figure 2).<sup>2</sup>

**H3a:** Independent auditors' assessment of enabling resources is positively associated with their behavioral beliefs regarding CA services.

**H3b:** Independent auditors' behavioral beliefs regarding CA services are positively associated with their willingness to provide CA services.

## RESEARCH METHODOLOGY

Participants include a cross-section of audit and accounting professionals, including local, regional, national and "Big 4" accounting firms. Email addresses for 997 local/regional firms were hand collected from an online database and representatives of the 'Big 4' and national firms were contacted directly by the authors.

An email (Exhibit 1), which also served as the letter of informed consent and contained a hyperlink to the online survey, was personally addressed to each local/regional firm's managing

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<sup>2</sup> Examining the impact of: (1) willingness on behavioral intention, (2) perceived behavioral control on behavior and (3) behavioral intention on behavior is beyond the scope of this study.

partner or the partner-in-charge of audit/assurance services. Representative of the 'Big 4' and national firms were forwarded an email identical to the local/regional email, which they in turn forwarded to potential participants within their respective firms.

### **Initial Instructions and Measured Variables**

Participants were told that the survey was designed to gain insight into issues related to the development and implementation of continuous auditing and that we were interested in obtaining the views of a cross-section of accounting professionals. Anonymity was assured and participants were asked to respond even if they (or their firm) did not provide audit or assurance services. After reading the CICA/AICPA (1999) definition of continuous auditing participants were asked to respond to forty statements using a scale of 1= "strongly disagree" and 7 = "strongly agree" (Exhibit 2). Twenty-two of the 40 survey statements serve as indicators of the latent variables shown in Figure 2 (i.e. enabling resources, perceived behavioral control, subjective norm, behavioral attitude and, willingness).

#### *Willingness*

Willingness (desire) translates attitudes into intentions and is a measure of the strength of one's desire to perform a behavior (Bagozzi 1992). Auditing participants were asked three questions designed to reflect their willingness to provide a variety of CA services under various conditions. Participants responded to the following statements, which are shown in Table 2: (1) I would be willing to provide continuous assurance on the effective operation of controls over systems or processes for client databases that are publicly accessible, (2) I would be willing to provide continuous assurance on the effective operation of controls over systems or processes for

client databases that are not publicly accessible and, (3) I would be willing to provide continuous assurance on financial statements that are available on demand.

### *Behavioral Beliefs*

Behavioral beliefs are “an individual’s positive or negative feelings (evaluative affect) about performing the target behavior” (Fishbein and Ajzen 1975, p. 216). For an attitude to form, individuals must first evaluate cognitive information or affective information (Eagly & Chaiken 1992, Zanna and Rempel 1988). As a professional group, auditors’ cognition based beliefs regarding audit firm business risk affect their willingness to accept particular client engagements (Johnstone 2000). Factors that in combination affect the engagement decision include potential engagement profitability, human resource availability and skill set, litigation issues, and any perceived advantages inherent in CA. Thus, participants were asked to evaluate the following statements, which are also shown in Table 1: (1) The cost of providing assurance based on continuous auditing methodologies is prohibitive; (2) Continuous audit methodologies require expanding the audit team skill set, (3) Continuous auditing will require more day-to-day partner engagement involvement , (4) Continuous auditing will lead to a reduction in total professional staff for your firm; (5) Continuous auditing will increase firm litigation exposure, (6) Continuous auditing will decrease firm litigation expense and, (7) Continuous auditing will help the external auditor to evaluate and report annually on the effectiveness of internal control over financial reporting. These statements were selected to capture the participants’ beliefs regarding the potential impact of CA on audit firm business risk.

### *Subjective Norm*

In this study, the construct, subject norm, is a measure of how independent auditors perceive the importance of continuous auditing to referent others (e.g. client management,

investors, and other stakeholders). As shown in Table 1, participants were asked to consider the desire/demand for CA among referent others within a CA context by responding to the following statements: (1) The demand for continuous auditing will be driven by regulators, (2) The demand for continuous auditing will be driven by investors, (3) The demand for continuous auditing will be driven by other stakeholders; (4) The demand for continuous auditing will be driven by client senior management; and (5) The demand for continuous auditing will be driven by independent auditors.

#### *Perceived Behavioral Control*

Perceived Behavioral Control is “the perceived ease of difficulty of performing the behavior” (Ajzen 1991, p. 188). Auditing participants were asked three questions that were designed to reflect their assessment of the feasibility of providing CA services. Participants responded to the following three statements: (1) It is currently possible for my firm to provide continuous auditing services; (2) It is currently possible for my office to provide continuous auditing services; and (3) Providing continuous auditing services is currently not feasible for any members of the profession.

#### *Enabling Resources*

Enabling Resources reflect beliefs regarding the availability of requisite resources and opportunities (Ajzen and Madden 1986). Because external audits are regulated and highly dependent on enabling technologies, participants were asked to respond to the following questions: (1) Suitable technology is NOT currently available for performing continuous audits; (2) There is sufficient guidance (GAAS) regarding the use of continuous auditing methodologies; (3) Currently, continuous audits are not feasible due to a lack of audit firm technology

infrastructure; and (4) Currently, continuous audits are not feasible due to a lack of client technology infrastructure.

[Insert Table 1]

### **Data Analysis**

As shown in Figure 2, three of the latent variables in current study (i.e., behavioral attitudes, subjective norm, and behavioral control) are both exogenous and endogenous. In addition, the indicators for behavioral attitudes and subjective norm are formative while the indicators for enabling resources, behavioral control, and willingness are reflective. Thus, partial least squares (SmartPLS 2.0 2005) is used for assessing the reliability of the measurement model and testing the structural model. Factor loadings, composite construct reliability and average variance extracted are employed to assess convergent validity of the latent variables with reflective indicators. Formative indicators, on the other hand, combine different facets of the latent variable; and, it is important to rule out the over weighting of any particular facet. The variance inflation factor is calculated to rule out possible indicator multicollinearity. Discriminant validity is assessed using Kline's (2005) heuristic of inter-construct correlations less than 0.85; for the latent variables with reflective indicators; the squared inter-construct correlations is also compared to the average variance extracted as an additional test of discriminant validity (Hair et al., 2006).

### **CURRENT STATUS OF THE PROJECT**

We have collected the data and are currently completing data analysis and drafting a working paper. If accepted for the conference we would present a complete draft of the working paper.

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Figure 1: Theory of Planned Behavior Model adapted from Ajzen (1991) and Bagozzi (1992)

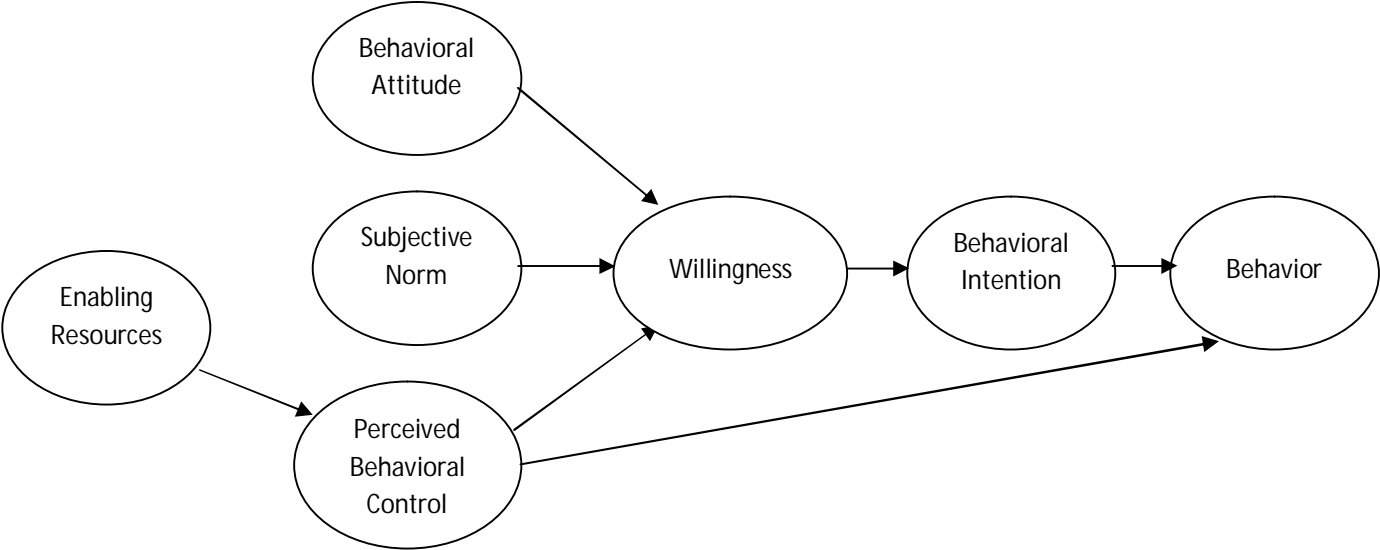
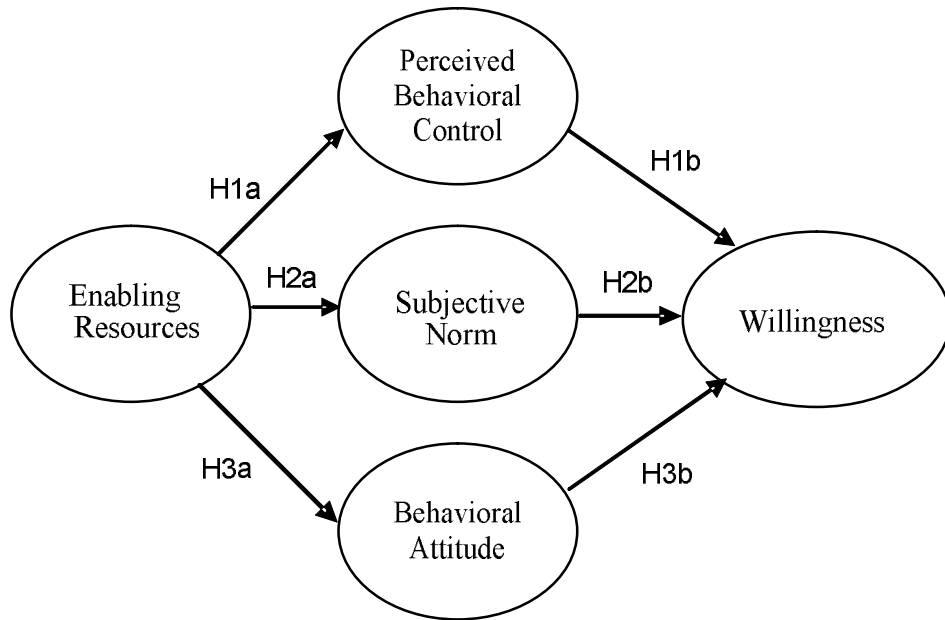


Figure 2: Research Model



**Table 1 Measured Variables**

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**Behavioral Attitude**

1. The cost of providing assurance based on continuous auditing methodologies is prohibitive. (rc)
2. Continuous audit methodologies require expanding the audit team skill set.(rc)
3. Continuous auditing will require more day-to-day partner engagement involvement.(rc)
4. Continuous auditing will lead to a reduction in total professional staff for your office. (rc)
5. Continuous auditing will increase firm litigation **exposure**.(rc)
6. Continuous auditing will decrease firm litigation **expense**.
7. Continuous auditing will help the external auditor to evaluate and report annually on the effectiveness of internal control over financial reporting.

**Subjective Norms**

1. The demand for continuous auditing will be driven by **regulators**.
2. The demand for continuous auditing will be driven by **investors**.
3. The demand for continuous auditing will be driven by **other stakeholders**.
4. The demand for continuous auditing will be driven by **client senior management**.
5. The demand for continuous auditing will NOT be driven by **independent auditors** (rc).

### **Perceived Behavioral Control**

1. It is currently possible for my **firm** to provide continuous auditing services.
2. It is currently possible for my **office** to provide continuous auditing services.
3. Providing continuous auditing services is currently NOT feasible for any members of the profession (**rc**).

### **Enabling Resources**

1. Suitable technology is NOT currently available for performing continuous audits (**rc**).
2. There is sufficient guidance (GAAS) regarding the use of continuous auditing methodologies
3. Currently, continuous audits are not feasible due to a lack of **audit firm** technology infrastructure (**rc**).
4. Currently, continuous audits are not feasible due to a lack of **client** technology infrastructure (**rc**).

### **Willingness**

1. I would be willing to provide continuous assurance on the effective operation of controls over systems or processes for client databases that are publicly accessible.
2. I would be willing to provide continuous assurance on the effective operation of controls over systems or processes for client databases that are NOT publicly accessible.
3. I would be willing to provide continuous assurance on financial statements that are available on demand.

## **EXHIBIT 1**

Dear INSERT NAME:

We are conducting a survey of a broad spectrum of accounting professionals in an effort to assess the current and expected demand for continuous audit/assurance services. It is our hope that this research project will provide insight into issues related to the development and implementation of "Continuous Auditing". We believe it is important to obtain opinions from a cross-section of accounting professionals, thus we would like you to fill out this survey even if you or your firm does not currently provide audit/assurance services.

Your individual responses to this survey will remain anonymous, your participation is voluntary and you do not have to answer any question(s) that makes you uncomfortable. While you will not receive any compensation for completing this survey, if you would like a copy of the aggregate results, you will have an opportunity to provide an e-mail address for that purpose. The e-mail addresses will be retained in a separate file; this file will NOT be cross-referenced to the survey data, thus preserving response anonymity; the e-mail address file will be destroyed after the aggregate results are disseminated.

Completing this survey should take about 10 - 15 minutes of your time and you can access the survey at:

[http:// asp](http://asp) .

If you have additional questions regarding or difficulty accessing the survey, please contact me for assistance.

Finally, we are very aware of how valuable your time is and would like to thank you in advance for completing this survey. Your feedback is critical; we need a broad cross-section of accounting professionals to expand our understanding of the issues surrounding the development and implementation of continuous audit/assurance services.

Only persons 18 years of age and older may participate in this study.

Sincerely,

