December 2007

How Do Users Cope with Trial Restrictions? A Longitudinal Field Experiment on Free Trial Software

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HOW DO USERS COPE WITH TRIAL RESTRICTIONS?

A LONGITUDINAL FIELD EXPERIMENT ON FREE TRIAL SOFTWARE

Social and Behavioral Aspects of Information Systems

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Abstract

Software vendors often provide software for free download but with restrictions (e.g., time and/or functionality restrictions). The question arises as to what extent the restrictions should be set to induce users to procure the full version. This study seeks to answer this question through two perspectives: expectation-disconfirmation and coping behavior. Based on these perspectives, a research model of user's coping reactions toward software restrictions is built. Subsequently, a longitudinal field experiment is conducted to verify the hypotheses. Results show that negative disconfirmation on time/functionality restriction positively/negatively influence the adoption of rational thinking strategy, which in turn positively influence the level of action coping. As a result, the degree to which action coping strategy is exploited positively influences the user's willingness to pay. Theoretical and practical implications of the findings are discussed.

Keywords: Free trial software (FTS), expectation-disconfirmation paradigm, coping theory

Introduction

Currently, software firms advertise their products through offering free trial software version to draw the attention of potential buyers. We name such software as free trial software (FTS). Since software is an experience product that requires an evaluation to gauge the quality (Kempf and Smith 1998), the FTS can greatly help reduce the uncertainty and the risk related to product acquisition (Rogers 1995). However, software firms also worry that FTS may weaken the user's propensity to purchase the actual version of the software (Gallaugher and Wang 2002; Tang 2003). To reduce such cannibalization effect, software firms impose trial restrictions, including time restriction and/or functionality restriction, on the FTS.

The presence of trial restrictions may create a distressing trial episode for the users (Duhachek and Iacobucci 2005). While users may have anticipated certain level of restrictions on FTS, they may still experience difficulties when the actual situation does not match their anticipations. If the expectation is not met, negative disconfirmation occurs (Oliver 1980; Oliver 1993), leading to the users experiencing distress in evaluating the FTS (Mano and Oliver 1993; Westbrook and Oliver 1991; Yi and Baumgartner 2004). To this end, the effectiveness of trial activities may be affected, triggering coping strategies (Griffth 1999; Pinsonneault and Rivard 1998), which in turn affects trial outcome evaluation and purchase decision making (e.g., Beaudry and Pinsonneault 2005; Yi and Baumgartner 2004).

However, to our knowledge, the role of user's involvement and trial behaviors in determining post-trial commitment decisions is seldom studied. Specifically, we have little knowledge about how users cope with such an adverse trial situation as expectations toward restrictions is negatively disconfirmed. Most extant research on FTS focuses on the issue of providing free trial (e.g., Haruvy and Prasad 1998; Jiang and Sarkar 2003) or how to design the quality of free trial from the perspective of its economic value for vendors (e.g., Conner 1995; Tang 2003). One exception is the work by Yang et al. (2006), which observes that disconfirmation of trial restrictions significantly influences one's attitude toward the product and software firm. However, they did not investigate a user's trial behavior patterns, especially the counter strategies for managing the negative disconfirmation. In this light, this research seeks to answer two questions: (1) what will the user do to cope with the situation when the FTS restrictions are worse than expected? (2) How will the coping thoughts and behaviors influence a user's purchase decision making?

To answer these questions, we apply the coping theory (Lazarus and Folkman 1984) to identify the induced coping behaviors under the influence of negative disconfirmation on trial restrictions. A longitudinal field experiment was conducted to test the model. We believe this research can help to establish a theoretical foundation of the important mediating coping behaviors in influencing post-trial decision making for software adoption (i.e., propensity to procure). By better understanding trial users' feelings and behavior toward the restrictive interventions, the software market practitioners can anticipate greater financial achievement through utilizing the benefits of FTS and mitigating the side-effects brought about by the restrictions at the same time.

The rest of the paper is organized as follows: in the next section, we review the theory on expectation-disconfirmation and coping, by relating to the free trial context. The theoretical model of proactive coping toward adverse trial restrictions is then introduced. The third section presents a longitudinal field experiment, followed by data analysis and results. Lastly, we conclude the paper with discussion, limitation and future research, and implications from both theoretical and practical perspectives.

Coping with FTS Restrictions

Expectation-Disconfirmation in Free Trial

In recent years, research has increasingly recognized the important role of negative consumption situation and consumption emotions in influencing consumer behaviors such as performing judgment and choice tasks (Lerner and Keltner 2000; Raghunathan and Pham 1999; Zeelenberg et al., 2000). One common form of stressful consumption environment is related to the violation of expectations (Zeelenberg et al., 2000). Being uncertain about future consumption outcomes, an individual may form expectations about the benefits to be obtained in consumption activities (Olson et al., 1996). Likewise, the expectation-disconfirmation theory (EDT) (Oliver 1980) depicts a process model whereby users establish initial pre-usage expectation (belief) about a product, experience its usage overtime, and form post-usage perceptions of the product (Bhattacherjee and Premkumar 2004). The original performance-specific expectation serves as the reference point, against which the level of observed performance will be compared (Oliver 1980; 1993). When the observed performance turns out to be below user's original expectation, discrepancy occurs and is reflected in the display of negative disconfirmation (Bhattacherjee and Premkumar 2004).

Furthermore, disconfirmation also plays a role in the formation of consumption emotions. For example, Westbrook and Oliver (1991) showed that expectancy disconfirmation was positively related to the pleasant surprise and interest dimensions of emotions and negatively related to the hostile emotions. Similarly, Oliver et al. (1997) found that positive affect was a function of how surprising the consumption experience was, how much arousal it generated, and how much it exceeded one's expectations. Specifically, disappointment arises when the chosen option results in a worse than expected outcome (Zeelenberg et al. 2000; Yi and Baumgartner 2004).

The stressful consumption situation and its resultant negative emotions would affect an individual's post-exposure reaction (Yi 1990), such as the adjusted beliefs and continued product usage or non-usage (Yi and La 2004). From a pessimistic perspective, the negative disconfirmation can lead to the total abandonment of the trial process, which may be detrimental for software vendors (Frijda 1994). From an optimistic perspective, it can result in other coping strategies being applied by the user to effectively deal with the noxious encounter (e.g., Luce et al., 2001).

We regard the free trial as a self-directed process during which the individuals intend to "take the initiative in diagnosing their needs, formulating trial goals, identifying human and material resources for trial, choosing and implementing appropriate trial strategies and evaluating trial outcomes" (Knowles 1975, p.18). In such an environment, users are responsible for identifying what to learn, when to use and how to evaluate the FTS

(Guglielmino and Guglielmino 2001; Kempf and Smith 1998). Hence, when trial restrictions on time and/or functionality are perceived to be worse than expected, the situation is likely to be appraised as stressful (Lazarus and Folkman 1984). This phenomenon can also be explained by the cognitive appraisal function in the coping theory (Lazarus and Folkman 1984) which is often adopted to explain users' adaptational acts toward disruptive events. In the primary appraisal, any encounter with the environment that is relevant to the person's future benefits but has not yet caused any damages would be analyzed in terms of threat or challenge (Lazarus and Folkman 1984). When the trial restrictions are below one's expectation, the smooth and complete software product assessment may be impeded (Yang et al., 2006), which consequently influences the affect toward the situation and subsequent trial behaviors (e.g., Kempf and Smith 1998). To achieve the original goals, the user will attempt to analyze and cope with the negative situation. To this end, the coping process and activities toward unexpected restrictions is the main focus of this research.

Coping Theory

Coping, defined as thoughts and behaviors that people use to manage the internal and external demands of situations that are appraised as stressful (Lazarus and Folkman 1984), is a psychological process embedded in a network of cognitive, attitudinal and behavioral correlates (Carver and Scheier 1994). It emphasizes a wide range of cognitive and behavioral responses that ordinary people use to manage distress and address the problem of daily life causing the distress (Folkman and Moskowitz 2004) (i.e., in a situation of product consumption). As an adaptational process (Beaudry and Pinsonneault 2005), coping deals with the disruptive situation or condition that is appraised as personally significant and as taxing or exceeding the individual's resource (Lazarus and Folkman 1984, pp. 141). The coping process is initiated when the individual appraises that important goals have been harmed, lost or threatened (Folkman and Moskowitz 2004). The adaptation behaviors are acts that individuals perform in order to cope with the perceived negative consequences of the disruptive situations (Beaudry and Pinsonneault 2005).

Before initiating coping activities, an individual conduct primary and secondary appraisal to evaluate the potential consequences of the encounter (Lazarus and Folkman 1984). The primary appraisal is to assess the nature of a particular event with respect to one's personal relevance and importance. For example, one disruptive encounter may be appraised as either a threat that may harm the individual as anticipated or a challenge that can have positive outcomes such as potential for gain or growth (Carpenter 1992). The secondary appraisal involves the evaluation of available coping options. It mainly addresses the level of control over the situation and available resources to determine how to deal with the situation.

Based on the appraisal results, individuals devote coping effort by performing different actions to deal with the situation at hand (Beaudry and Pinsonneault 2005). Coping efforts can be distinguished between problem-focused coping that is strategy-oriented toward handling the specific aspects of the situation (Beaudry and Pinsonneault 2005) and emotion-focused coping that relies on changing one's perception of the situation (Beaudry and Pinsonneault 2005; Lazarus 1991). The entire coping process can occur from the period when the individual forms the expectation, followed by the period in which the stressful situation happens or has taken place (Folkman 1992). Recent research has shown that consumers frequently utilize both types of coping strategies, which are determined largely by the emotional antecedents within a single stress episode (Luce 1998; Luce et al., 2001; Mick and Fournier 1998; Sujan et al., 1999). Furthermore, the coping strategies can be decomposed into various subcategories within multidimensional hierarchical latent structures. For example, Duhachek (2005) proposes two types of coping strategies, action coping and rational thinking, which can be applied to deal with the adverse situation and meanwhile can help achieve the predefined goals. Specifically, rational thinking refers to thinking positively toward attenuating stressful circumstances which falls into the emotion-focused coping strategies and action coping as a form of problem-focused coping is characterized by taking direct actions to resolve the problem at hand (Duhachek and Iacobucci 2005). We suggest that negative emotions resulted from negative disconfirmation in free trial will influence the adoption of these two types of coping strategies. The effects of coping strategies in turn play a crucial role in inducing consumer's purchase decision making. Hence, the coping strategies of rational thinking and action coping which are elicited by free trial restrictions and their effects are the main focus of this research.

Theoretical Model

To understand users' responses to negative disconfirmations of the trial restrictions, we build a theoretical model based on coping theory to explore the reactive trial process. Considering that cognitive appraisal, emotional

reactions and coping strategies may unfold nearly simultaneously (Duhachek and Iacobucci 2005), we propose that coping thoughts and behaviors are crucial intermediaries connecting the restrictions and subsequent purchase decision making, which is the focal dependent variable in this study.

Negative Disconfirmation and Coping

In many consumption situations, consumers experience distress and related negative emotions, such as feeling disappointed when their product expectations are not reached (Yi and Baumgartner 2004). When uncertainty is perceived to accompany consumption, people tend to form expectations about the performance of possible encounters (Zeelenberg et al., 2000) and decide subsequent behaviors based on these expectations (Olson et al., 1996). More specifically, if the current state of affairs is worse than expected, the psychological stress appraised by the individual may be perceived as a threat to the future benefits of the individual (Lazarus 1999).

The appraisal of threats further evokes negative emotions and thus has the potential to adversely affect people's performance (Weiss and Cropanzano 1996). In such situations, if individuals aim to perform successfully, they have to overcome the effects of negative situations that threaten their goals through self-regulation (Brown et al., 2005). In other words, effective coping tactics need to be exercised by evaluating the distance of the current state to the desired goal (Baumeister et al., 1994; Carver and Scheier 1998). Individuals are prompted to interrupt the ongoing goal pursuit to analyze the situation and its implications for their future achievement (Ben-Ze'ev 2000; Lazarus 1991; Schwarz and Clore 1996). In the subsequent process of self-regulation, coping behaviors will change one's behavioral state from a dismal situation to one that enables individuals to resolve problems, relieve emotional distress and stay on the right track toward achieving original goals (Brown et al., 2005; Carver and Scheier 1998; Folkman and Moskowitz 2004). In such contexts, certain coping mechanism including either cognitive or behavioral actions (e.g., rational thinking and action coping) can help reach positive coping results (e.g., Duhachek 2005; Zautra et al., 1996; Amirkhan 1990).

In this study, a stressful trial environment is created by imposing more intensive restrictions on time and/or functionality dimension. Compared with the certain state of amenities (i.e., full functionality or unlimited time trial), such stressful situation is more likely to trigger thoughts of fulfilling expectations in an individual. Once the expectation is disconfirmed, individuals experience two kinds of negative emotions: disappointment (Zeelenberg et al., 2000) and worry (Yi and Baumgartner 2004). Furthermore, the coping strategies involve rational thinking and action coping to deal with these two emotions respectively.

Rational Thinking to Cope with Disappointment

Disappointment is closely related to higher scores on the aspect of unexpectedness (Frijda et al., 1989) which indicates threat to one's perceived control over the trial process. Upon realizing stronger restrictions, a user will attribute the difficulties in software evaluation to external parties. While some would have chosen to terminate the trial (Zeelenberg, et al., 2000), those who choose to continue would conduct cognitive or emotion-focused coping to mitigate the disappointment to maintain the interest for future testing (Kahn 2005). Specifically, the latter strategy is represented by rational thinking which refers to the deliberate attempts to prevent subjective emotions from directing individual behaviors (Duhachek 2005).

Facing disappointment with the restrictions, the user may attempt to suppress the negative feeling. For example, to one extreme, the user manage to persuade himself/herself that it is reasonable for software firms to restrict certain valid period or disable some components of the FTS to guarantee their own profit. To the other extreme, a user may also perceive a level of powerlessness which can result in a tendency to remove from the situation (Zeelenberg, et al., 1998). Due to the different effects of time vs. functionality restriction, the user is likely to treat the restrictions differently. Specifically, although the time restriction appears worse than expected, the user still can predict a successful trial outcome if he/she tries hard to overcome the disappointment toward the situation. In other words, the negative effects of time restriction could be converted from a threat into a challenge in the trial process and can be reduced through one's effort to cope. Thereby, when negative disconfirmation on time restriction increases, the urge to avoid negative emotion (disappointment) from impairing the software evaluation also increases, that is, rational thinking is increasingly adopted by aiming for effective trial results. In contrast, the increase of the functionality restriction boosts the negative feelings because of its irrecoverable nature that the restricted functions cannot be tested directly by all means. Hence, the increase of negative disconfirmation on functionality restriction may increase the possibility of goal abandonment and reduce the adoption of rational thinking as a cognitive coping

strategy (Frijda 1994; Carver and Scheier 1998), while the opposite effect (i.e., increasing rational thinking) applies to the time restriction. Therefore, we hypothesize:

> ***H1a:*** *The more negative one's disconfirmation on the time restriction attached with the FTS, the more likely that rational thinking on restrictions will be adopted during the free trial.*
>
> ***H1b:*** *The more negative one's disconfirmation on the functionality restriction attached with the FTS, the less likely that rational thinking on restrictions will be adopted during the free trial.*

Action Coping to Cope with Worry

Besides disappointment, the negative disconfirmation on trial restrictions implicates threat to one's well-being (Skinner and Brewer 2002) and may also raise the emotion of worry (Yi and Baumgartner 2004). For example, shorter available trial period than expected implies that the user may not be able to fully understand the software through trying. Thus, to handle such adverse outcome that is certain or fairly certain to occur in the near future (Schwarzer and Knoll 2003), individuals engage in a problem-focused coping approach (e.g., Laux and Weber 1991). One typical form is the action coping which relates to direct, objective attempts to manage the source of stress (i.e., concentrating on the ways to resolve the problem) (Duhachek 2005). For example, to make better use of the limited trial period, the user can try to intensify the usage frequency. Similarly, additional sources can be applied to extend one's understanding about how the software functions (e.g., through product feature description or third-party information). As long as the negative feeling (i.e., worry) associated with negative disconfirmation on restriction is mitigated, the goal of achieving comprehensive software knowledge can be realized.

However, individuals also prefer to choose the coping strategy that promises the greater chance of success and accomplishment of task (Begley 1998). The action coping behaviors occur primarily in the case of sufficient control over the situation (Folkman 1992; Folkman and Moskowitz 2000). In contrast, overly relying on problem-focused coping in low control situation leads to frustration and distress (Beaudry and Pinsonneault 2005). Thus, an individual will tend to escape from the situation to protect one from suffering any prospective harm (Roseman et al., 1994) when the situation becomes unmanageable. Mental disengagement that takes one's mind off the current problem beyond control and guides one to give up the solution is likely to be the option (Yi and Baumgartner 2004).

In the context of free trial, the perceived possibility of managing the situation tends to be different regarding time vs. functionality restriction. Compared with irreversible restrictions such as functionality restrictions, time restriction is easy to resolve through intensified trial. Therefore, users attempt to try harder if they find very limited valid trial period is offered (e.g., 5 days for relatively complicated software) while they are confident in overcoming the restriction and achieving the software evaluation goal. By doing so, the user will be able to avoid the negative outcomes (e.g., the FTS expires before being fully tested) and greater disconfirmation causes greater worry to motivate further actions to resolve the problem. However, when excessive important components of the FTS for trying than expected have been removed, the worry of negative trial outcomes appears more obvious than those uncertain ones (e.g., insufficient time to test because of time restriction). Since it is impossible to directly test the disabled functions, a user has to rely on other resources such as feature description in the help menu. To this end, action coping strategy becomes less applicable when functionalities are excessively disabled, unless a user wants to overcome the restrictions in illegal ways (e.g., cracking the FTS). Hence, we hypothesize that the likelihood for user to take action coping to explore the FTS will increase/decrease with the increase of negative disconfirmation on time/functionality restriction:

> ***H2a:*** *The more negative one's disconfirmation on the time restriction attached with the FTS, the more likely the action coping will be conducted during the free trial.*
>
> ***H2b:*** *The more negative one's disconfirmation on the functionality restriction attached with the FTS, the less likely the action coping will be conducted during the free trial.*

According to coping theory (Lazarus and Folkman 1984), different coping methods usually take place simultaneously and can either facilitate or impede each other in the coping process. Regarding the initiation of coping behaviors, we suggest the action coping that deals with the situation directly is more likely to be performed if one tries first to smooth negative feelings through a pure emotional way. For example, acceptance of the assigned treatments may help to stimulate the individual to positively engage in pursuing the desired goals. Contrarily, by holding certain negative emotions without any attempt to reduce them, an individual may become reluctant to think about applicable solutions for the problem. A vicious circle thus is formed when outcomes turn to be unfavorable as

expected and further increase emotional distresses. In the free trial context, if the individual is able to convince himself/herself the presence of time restrictions are always unavoidable and can be coped with, the probability for him/her to engage in coping behaviors (e.g., intensified software assessment) ascends. Otherwise, if the user is unable to release negative feelings, he/she may choose not to cope with the highly restricted free trial condition and look for better offers. Thus, we hypothesize that the occurrence of rational thinking will enhance the action coping behaviors through the free trial process:

> ***H2c:*** *Higher level of action coping will be performed if higher level of rational thinking is conducted by the user.*

Coping Outcomes and Willingness to Pay

Coping strategies or processes are not inherently good or bad (Lazarus and Folkman 1984). Whether the coping is effective depends on the outcomes of coping related to the specific stressful situation (Folkman and Moskowitz 2004). Outcomes refer to the status of diverse goals that are personally significant to the individual (Folkman and Moskowitz 2004) and related to regulation or deduction of distress and the management of the distressing problem at hand (Lazarus and Folkman 1984). Previous research on coping suggests that a successful outcome involves resolution of problem and maintenance of stable and positive emotional state (Zeidner and Saklofske 1996). In this study, coping outcomes can be categorized into two general types when relating to the goals of adopting FTS and the two coping strategies discussed. First, rational thinking can help reduce psychological stress (Zeidner and Saklofske 1996) and restore personal emotion stability (Beaudry and Pinsonneault 2005), i.e., from negative to neutral state. Second, action coping, which involves one in the process of solving problems, will increase the likelihood for the stressful situation to be resolved as compared with the non-action (Zeidner and Saklofske 1996). Action coping deals with negative emotions mainly through minimizing negative consequences (e.g., Beaudry and Pinsonneault 2005) which may further exacerbate psychological tensions.

In the free trial context, the execution of rational thinking and action coping jointly contribute to achieve the desirable outcomes. On the one hand, when certain level of rational thinking takes place, one's emotional state will likely keep on a relatively stable state and it may even turn to be positive if other advantages of the FTS are explored. Moreover, the restoration of emotions into positive and stable status contributes to the perception of favorable and enjoyable consumption experience, which is harder to change even if one's cognitive beliefs are disrupted by new information (Oliver 1999). Positive emotional experience in turn makes people maintain attention to the current state of affair with pleasure (Thatcher and George 2004). On the other hand, action coping directly addresses the unsatisfied restrictive conditions through motivating the user to engage in the trial more actively. Significant effort devoted to resolve the adverse consumption problems within the product trial process induces psychological lock in with the target as well (Johnson et al. 2000). The user will predict the necessary effort or resource to reach the same level of comfort or familiarity with new offers as he/she has for the current product (e.g., Chen and Hitt 2002), which is called learning cost in the product trial context (Shapiro and Varian 1999). People are usually reluctant to part from assets that belong to their endowment (Kahneman and Tversky 1984), such as the knowledge obtained. It indicates higher commitment to a vendor or a product (Chen and Hitt 2002; Thatcher and George 2004), which is crucial to make FTS users retain and purchase for continuous usage.

From a software firm's perspective, through providing free trial, software firms predominantly concern about whether they can successfully persuade users to buy. It refers to the concept of willingness to pay (WTA) which is represented by the amount an individual is willing to pay to acquire some goods or service (e.g., Simonson and Drolet 2004). A consumer's willingness to pay for a product reflects both the perceived value of the product and the sacrifice involved in acquiring (or abandoning) it (Simonson and Drolet 2004). For example, the assessment of the software value consists of both the product's perceived benefits (e.g., capability of assisting daily operation) and the perceived sacrifice (e.g., devotion of effort in test the free trial). Based on the value judgment, consumers will decide whether to purchase the item (Monroe 2003). Furthermore, the higher the price a user would like to pay after trying the software, the more likely firms can make profits through such marketing campaign. By relating to the commitment tendency, we propose that the coping effort is especially important to influence the user's willingness to pay (Bateman et al. 1997; Chen and Hitt 2002). Being involved in the trial process of constantly coping with the given situation, the user tends to produce psychological and emotional attachment or commitment with the target FTS (Fournier 1998). Hence, the user may tend to pay a higher premium for the software to continue its usage, as hypothesized:

***H3a**: The level of rational thinking during the trial will positively influence the willingness to pay for the software product.*

***H3b**: The level of action coping during the trial will positively influence the willingness to pay for the software product.*

The model of user's coping toward negative disconfirmation on restrictions is illustrated in Figure 1.

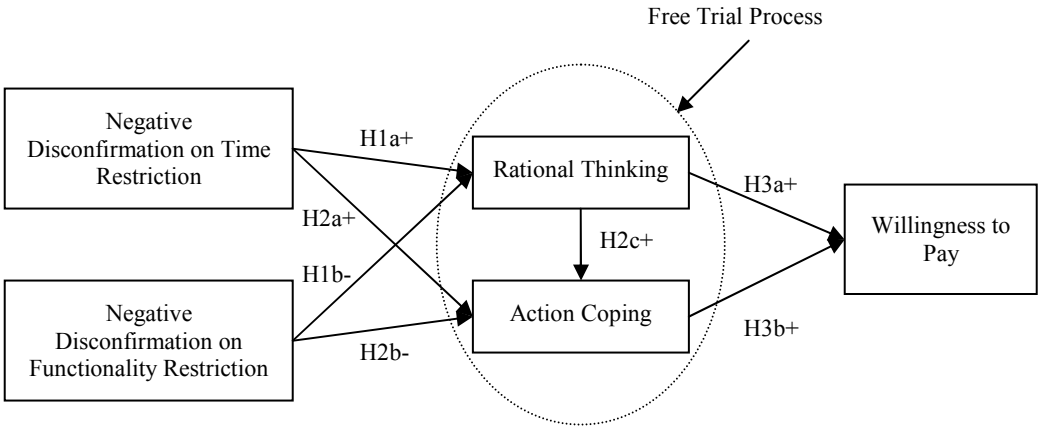

Figure 1. Research Model

Experimental Design

To test and verify the conceptual model, a longitudinal online field experiment was conducted between August 2006 and January 2007. Field experiment is suitable for this research to match the longitudinal feature of the free trial practice that users usually try the software for certain period. More specific, the time restriction and functionality restriction were manipulated for different treatment groups through different combinations. The main objectives of current experiment are to explore participants' actual reactions and usage in response to the predefined free trial restrictions and to test the restrictive intervention effects, including the effort to be devoted to try and the willingness to pay.

Factorial Design and Manipulations

First, we introduced the background of free trial software (FTS) and its restrictions. Detailed experiment procedure was listed in four steps based on the following scenario:

"You are in need of an image editing software and have found a suitable one named Photo Editor 1.1.0 (pe110) that is published by company ABC on its official website. You have enough money to buy it but you feel it is better to try it first. Therefore, you decide to download its free trial version to test on your own pc."

Second, the definitions and manipulations of different kinds of restrictive interventions were presented to respondents. Two types of restrictions, namely time restriction and functionality restriction, were explicitly indicated in relation to the specific software product chosen for this experiment. We adopted 3 (no/low/high time restriction) × 3 (core/ordinary/no functionality restriction) factorial design with the exception of both restrictions' absence. The low vs. high time restrictions were manipulated as 30 days' vs. 10 days' free trial. The ordinary vs. core functionality restrictions were manipulated as disabling the function of setting original size (in the "view" menu) which is obvious to the user vs. disabling the function of horizontal prewitt and vertical prewitt function (in the "filter" menu for edge detection) which needs further exploration. By excluding the condition of both restrictive interventions' absence, there were totally 8 treatment groups and participants were randomly assigned to each one. The manipulations of two restrictive features are shown in Table 1.

Table 1. Factorial Design in the Field Experiment			
Time Restriction	**Functionality Restriction**		
	Core	**Ordinary**	**Absence**
10 days	T1	T2	T3
30 days	T4	T5	T6
Absence	T7	T8	N/A

Procedure

We posted the experiment invitation letter in several most popular local software-related forums to invite participants. Each participant was randomly assigned to one of the eight treatment groups. The participants recruited in the experiment include people of different profiles and thus could facilitate generalization of the experiment results.

Before the trial, an introduction of the objectives of this experiment and the software features is given to each respondent. Participants are required to finish a preliminary survey on demographics and prior experience with Internet and software trial. After the preliminary survey, the information of the restrictions attached with the FTS was released to them and they were asked to complete a survey regarding their immediate responses toward the restriction information. This was to ensure that participants were aware of the restrictions before they start to test the software. Subsequently, the respondents were provided with the link to download the FTS. The target software was a photo editing software especially developed for the experiment. Participants in different treatment groups downloaded different version in terms of the trial restrictions.

The trial period proceeded as each participant was allowed to test the product on their computers according to their own manners with the given time and functionality. Participants were required to register their email to activate the software so that their usage log in terms of number of clicks can be recorded by the server. In order to compensate the loose control toward the experiment, we designed an online feedback form as one function of the software allowing users to concurrently write down any of their feelings and usage experience anytime and to send it back to the experiment coordinator. Participants were allowed to determine when to terminate the free trial even before the trial time expired. At the end of the valid trial period or upon receiving participants' feedback saying that they had tried enough, we sent the link of the post-experiment survey for them to complete.

Measures

In this study, verified questions from prior research were adapted, utmostly some of which (e.g., need and alternative availability) were specifically designed to measure the constructs. To enhance validity, one unlabled sorting session and one labeled were performed by recruiting IS postgraduate students (8 for each). Minor modifications were made to address the concerns raised by these judges. Since some participants' expectation might be lower than the actual restrictions after they were randomly assigned to different treatments, by assuming that the lowest scale (e.g., 1 in a 7-point Likert scale) could indicate a positive trend of the disconfirmation (Bhattacherjee and Premkumar 2004), we adopted the negative perspective to represent disconfirmation. The actual effort was measured by counting the number of clicks made by the software users. The measurements for each construct are shown in Appendix A.

Data Analysis and Results

Data Collection

Data collection was conducted by asking participants to finish self-reflected survey questionnaires during different period of the free trial. Besides, online feedback entered by participants was collected for future qualitative analysis. The free trial software program was designed to record participants' trial experience automatically including storing

every click made on each function. These click information was linked to the survey responses through the unique email address as the participant's identity in the experiment.

We provided nine lucky draw prizes with a total amount of 800 dollars to motivate participants, e.g., 200/150/100/50 dollar shopping voucher for the first to fourth prize correspondingly. In total, there were 135 participants attending the experiment while they were randomly assigned to one of the eight treatments. 129 complete data sets were kept for further analysis.

Control and Manipulation Check

Manipulation checks were performed by checking respondents' self-reported effort. Those who did not try the software at all but indicated the hours they tried were dropped from subsequent analysis. After this check, 120 valid data sets were kept; the number of respondents in each treatment ranges from 14 to 16. Among them, 76 participants who tried the software realistically simulate the real situations while others may forget to try the FTS after downloading. The demographic information is shown in Appendix B.

To ensure random assignment of respondents to the eight treatments in the survey, several one-way ANOVA tests were performed as control checks. All statistical tests were performed based on a 5-percent significance level. Results show no significant difference among the eight treatments in terms of the demographic factors indicated in Appendix B.

One-way ANOVA tests further indicate significant correlations between time restriction and disconfirmation on time restriction ($F = 39.851$, $p < 0.01$), and between functionality restriction and disconfirmation on functionality restriction ($F = 15.928$, $p < 0.01$). In Figure 2, the negative disconfirmation on both time and functionality restriction increase when restriction level increases. Time restriction levels 1 - 3 refer to no time restriction, 30-days' time restriction and 10-days' time restriction respectively. The functionality restriction level 1 – 3 refers to no functionality restriction, ordinary functionality restriction and core time restriction. The plot depicts that when there is no time restriction, the negative disconfirmation is the lowest. The difference of negative disconfirmation on functionality restriction is less significant between ordinary and core restrictions than that between ordinary and no restriction. These results indicate a successful manipulation of the treatments.

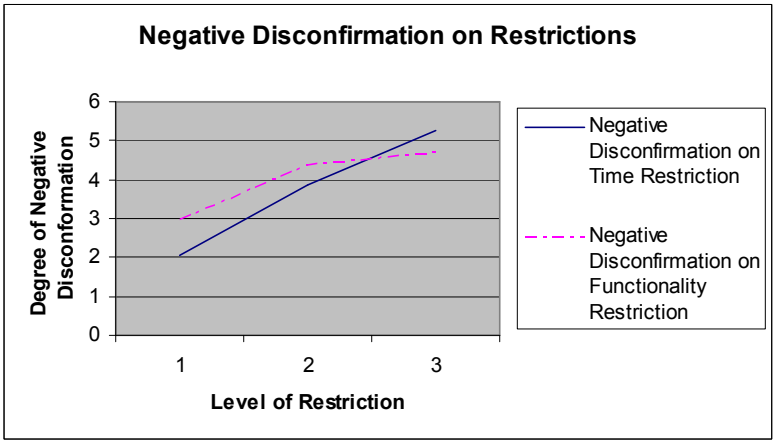

Figure 2. Disconfirmation on Time/Functionality Restriction

Testing the Measurement Model

The measurement model was evaluated by examining the convergent validity and discriminant validity of the research instrument using SPSS and PLS. The convergent validity was assessed by computing the reliability of indicators, composite reliability of constructs, Cronbach's Alpha and the average variance extracted (Hair et al. 1998). Results are shown in Table 2. All indicators in this study had reliability scores above 0.55 (Falk and Miller

1992), while most indicators had reliability scores above 0.707 which means adequate reliability. Composite reliabilities of constructs with multiple indicators exceeded the Nunnally's (1978) criterion of 0.70. The Cronbach's alphas were all higher than the required 0.70 (Nunnally 1978). The average variances extracted by constructs were all above the recommended threshold of 0.50 (Hair et al. 1998). Thus, the convergent validity was established.

To test discriminant validity, factor analysis incorporating all the indicators was conducted at first. As Table 3 shows, all the indicators measuring each construct loaded more highly on the intended construct than on other constructs (Thompson et al. 1991). Second, the squared root of the shared variance between a construct and its measures should be greater than the correlations between the construct and other constructs in the model (Igbaria et al. 1994). Through comparison, Table 4 shows that the diagonal values were all higher than those of the non-diagonal elements. Thus, all constructs fulfilled the requirement of discriminant validity.

Table 2. Results of Tests on Convergent Validity

Constructs and Indicators	Reliability of Indicators	Composite Reliability	Cronbach's Alpha	Average Variance Extracted
NEDISTIME		0.9574	0.911	0.9183
NEDISTIME1	0.9522			
NEDISTIME2	0.9643			
NEDISFUNC		0.9159	0.816	0.8448
NEDISFUNC1	0.9140			
NEDISFUNC2	0.9242			
RATHINK		0.8819	0.831	0.6026
RATHINK1	0.5963			
RATHINK2	0.7419			
RATHINK3	0.8413			
RATHINK4	0.8293			
RATHINK5	0.8434			
ACCOP		0.8864	0.922	0.6674
ACCOP1	0.7536			
ACCOP2	0.6066			
ACCOP3	0.9631			
ACCOP4	0.8979			

Table 3. Results of Factor Analysis

	Factor			
Indicators	***1***	***2***	***3***	***4***
NEDISTIME1	.023	-.040	**.957**	.003
NEDISTIME2	.031	-.091	**.948**	-.063
NEDISFUNC1	-.091	-.134	-.046	**.897**
NEDISFUNC2	.006	-.168	-.019	**.912**
RATHINK1	.195	**.586**	-.260	.030
RATHINK2	.173	**.647**	-.156	-.104
RATHINK3	.091	**.903**	.020	-.067
RATHINK4	.152	**.838**	-.072	-.188
RATHINK5	.249	**.837**	-.009	-.097
ACCOP1	**.916**	.133	-.037	-.034
ACCOP2	**.883**	.123	.118	.022
ACCOP3	**.857**	.239	.016	-.071
ACCOP4	**.862**	.237	-.129	-.068

Table 4. Discriminant Validity of Constructs				
	DISTIME	***DISFUNC***	***RATHINK***	***ACCOP***
DISTIME	**0.9583**			
DISFUNC	-.066	**0.9191**		
RATHINK	-.198	-.273	**0.7763**	
ACCOP	.000	-.132	.428	**0.8170**

Testing the Structural Model

After establishing the validity of the measures, we assessed the structural paths in the research model by applying SEM technique using Partial Least Squares (PLS), for hypothesis testing and conducted all statistical tests at five-percent level of significance. We chose PLS because it allows integrating the measurements and structural models. That is, PLS permits tests of how the independent variables vary, interact, and influence the dependent variable.

Figure 3 depicts the structural model including all significant variables and R^2 for the dependent constructs. The structural model could explain 12 percent of the total variability of rational thinking, 22.6 percent of action coping, and 12.5 percent of willingness to pay. The hypotheses are validated according to size, sign and significance of the path coefficient (refer to Table 5). In total, 4 out of 7 hypotheses were supported, while each path coefficient was with expected sign and significance above 0.05 level. Exceptions are found in H1b, H2b and H3a, where the interactions of the two independent variables are tested but we found no assumed effect.

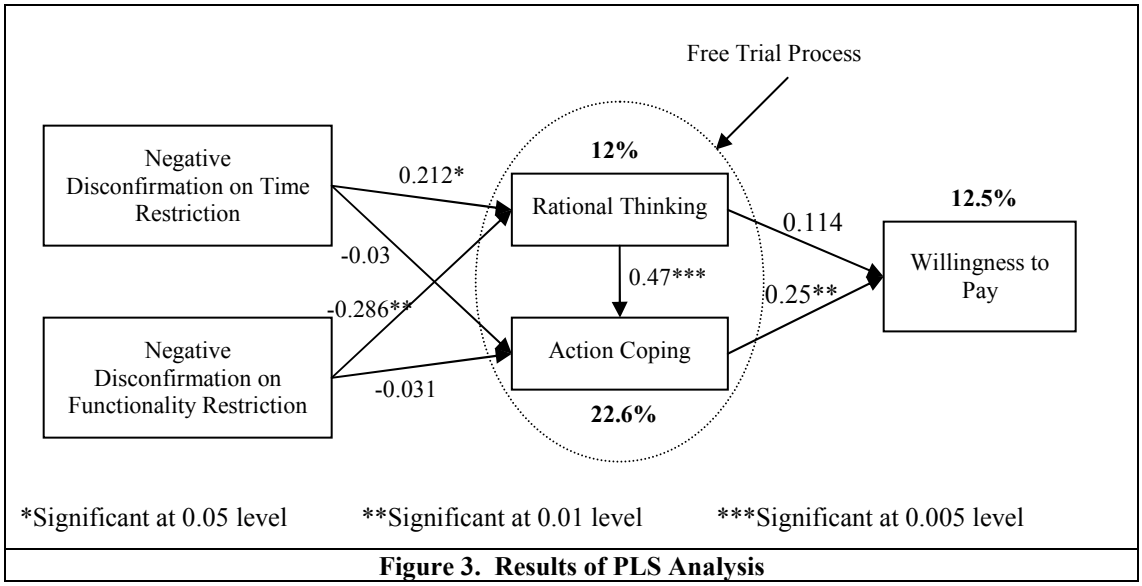

Figure 3. Results of PLS Analysis

Table 5. Results of Hypothesis Testing			
Hypothesis	Coefficient	P	Outcome
H1a: NEDISTIME to RATHINK	0.212	<0.05	Supported
H1b: NEDISFUNC to RATHINK	-0.286	<0.01	Supported
H2a: NEDISTIME to ACCOP	-0.030	NS	Not Supported
H2b: NEDISFUNC to ACCOP	-0.031	NS	Not Supported
H2c: RATHINK to ACCOP	0.470	<0.005	Supported
H3a: RATHINK to WILLPAY	0.110	NS	Not Supported
H3b: ACCOP to WILLPAY	0.265	<0.01	Supported

Discussion and Conclusion

Discussion of Results

This research examines the possible coping strategies that are likely adopted by the FTS users in face of negative disconfirmation on trial restrictions, i.e., stronger time and/or functionality restrictions than expected. These coping behaviors proposed further influence to the user's willingness to pay for the commercial software which is the target of the FTS provider. Data analysis shows that negative disconfirmation on time restriction positively influence the user's rational thinking strategy (e.g., control negative emotions toward the restriction) which means users are more motivated to cope with the time restriction as a challenge to continue the trial. In contrast, negative disconfirmation on functionality restriction negatively influences rational thinking because of the irreversible nature of the functionality restriction. In turn, the level of rational thinking behavior positively influences the level of action coping (e.g., focusing on the trial problem itself). As a result, the more action coping being conducted, the higher premium the user will likely pay for the software, namely greater willingness to pay. However, negative disconfirmation on both time and functionality restriction has no significant influence on the action coping strategy. The user's willingness to pay is not found to be influenced by the level of rational thinking.

The unsupported direct influence of negative disconfirmation on action coping reflects the proposition that people make behavioral responses after certain attitudinal responses are established (e.g., Yang et al. 2006). In other words, the user's conception toward the situation or the product is more important to influence subsequent behavior than the situation or product itself. One explanation is that users may envisage other plausible alternatives in the software market to substitute the current FTS. Thus they may treat the FTS and free trial casually since it is always free and they are less likely to turn to the solutions of regulating their own behavior directly. If being provided with easier options, he/she will deem it unwise or irrational to focus on the current adverse restrictive situation. To this end, no significant action coping behaviors are initiated immediately after the user perceives negative disconfirmation on the restrictions. However, an individual's behavior can be influenced by his/her emotional state (e.g., stable or not). If the user manages to adjust his/her feelings toward the negative disconfirmation on restrictions first, proactive behavioral coping strategies are more likely to be adopted in attempt to resolve the problems than otherwise. In contrast, failure of conducting rational thinking toward the adverse restrictive situation will probably leads to task abandonment and thus effective action coping will not be executed.

At the same time, no significant relationship is found between rational thinking and the user's willingness to pay. It suggests that the restoration of a stable emotional state related to the FTS restrictions has little impact on an individual's attitude toward the software purchase. Rational thinking strategy only helps the user face the reality to proceed with the free trial positively. In other words, successful action coping deployment depends on the rational thinking. In turn, the user could approach his/her evaluation goal by adopting the action coping strategy which will directly influence the user's judgment on the software value. Specifically, the effort of action coping is also counted in when the user make a decision of how much he/she would like to pay for the software. To this extent, the level of action coping has more significant influence on willingness to pay than the level of rational thinking.

Limitations and Future Research

Two limitations of this study need to be pointed out for further improvement of future study. First, there may be factors besides the treatment design influencing experiment participants' behavior, therefore confounding the results. For example, the process of free trial is not within the full control of experiment coordinator and how the participants tried the software is also influenced by certain environmental changes such as different personal schedules. Another possibility is that the software provided for test may not be favored by some participants so that responses could be biased by their indifference toward the product. In addition, the differences between real commercial software product and the designed one might also influence users' reaction. For example, some participants pointed out the flaws of the software design such as lack of mouse interaction on images, absence of encryption, slowness caused by java application, etc. in the feedback. This may be the reason why the factors we studied explained a lower than expected variance on the dependent variables (e.g., willingness to pay). However, to simulate the real free trial process, we have to sacrifice the tight control which usually can be achieved in lab

experimental settings. We believe the current field experiment is realistic enough to reflect the true trial experience of most FTS users. Second, the sample size is not as large as we anticipated due to the complexity of the experiment itself. Some respondents even forgot to try it or did not complete the survey whose entries were abandoned as useless data. In addition, although we have expanded the focus to a wide range of demographics, the majority participants were still students which limits the generalizability of this study.

Referring to the above mentioned limitations, we expect future research to explore the possible personal (e.g., personality related to performing certain task) and environmental factors (e.g., different forms of intervention from the firm) which may influence the free trial process and outcomes in depth. The product categories adopted in the experiment can be expanded to cater to the interest of most participants with varied profiles. This stream of future research is believed to enrich the current findings of users' free trial behavior and decision making.

Implications and Conclusion

This research focuses on user's coping reactions toward the time/functionality restrictions which are typical features of the FTS. Specifically, we explore the scenario in which user's expectation toward the restrictions is negatively disconfirmed and investigate how different coping behaviors and strategies will lead to the subsequent decision making. It contributes to the research domain of FTS usage from a consumer's perspective and the broader disciplines including consumer behavior, consumer psychology, marketing, and Information Systems (IS).

Theoretically, expectation-disconfirmation theory is adopted to describe the phenomenon as the first influential step to determine subsequent trial process. It helps to deepen our understanding that the major factor to elicit relevant coping behaviors is the internal evaluation of the situation rather than objective encounters. Furthermore, this study elaborates on the coping theory and literature to explain how users react toward the negative situations. While the mainstream research used an abstract categorization of problem-focused coping and emotion-focused coping, we specifies the cognitive and behavioral coping strategies by incorporating most recent coping structures while focusing on the relatively more effective coping means (as opposed to those pessimistic ones). Specifically, rational thinking and action coping strategies are believed to be the most important determinants to the successful trial experience and post-trial decision making which call for significant attention to observe. As far as we know, this research represents the first investigation on IT user's reaction toward the adverse trial restrictions in the IS field. Such an emphasis on the most crucial and positive (although not exclusive) determinants of purchase behavior can support achieving a fundamental and direct understanding toward the phenomenon. It also extends the previous study in terms of elaborating on the specific coping behaviors and the coping process rather than a general idea of coping effort (e.g., Yang et al., 2006).

Methodologically, the conduct of field experiment provides strong and realistic support to verify the research hypothesis which has not yet been achieved before. The power of the field experiment in simulating real trial phenomenon helps uncover the trial process and user's psychological and behavioral reactions which is hard to realize otherwise. Thus, based on the field experiment results, the current research model can contribute to future research on FTS or other IT product trial by establishing the theoretical foundation of user's coping reactions toward the adverse restrictive conditions.

Practically, this research is able to guide the market practitioners to intervene with the trial process more proactively. By acknowledging user's reactions and behaviors, software vendors can design effective interventions to alleviate negative impacts from restriction disconfirmations. Especially when the focus is on proactive coping process to influence purchase intention, it becomes more straightforward for practitioners to plan different marketing strategies to directly address the issue with visible effectiveness and efficiency. According to the data analysis results, rational thinking is the first crucial step to fulfill before any effective action coping strategy could be adopted, while action coping directly influences a user's purchase decision making. Moreover, the degree to which rational thinking is realized is influenced by negative disconfirmation on time or functionality restriction in different ways. Therefore, to help achieve better persuasion outcomes (i.e., inducing a user to pay a high premium), FTS providers should design the restrictions to maximize a user's adoption of rational thinking in the first place. One example could be increasing a user's negative disconfirmation on time restriction but decreasing that on functionality restriction. In addition, software vendor can concentrate on the complementary means (e.g., online tutorial or customer assistance) to reduce a user's perceived difficulty of assessing the FTS when restrictions are present. Thus, the current research will help to guide marketers regarding appropriate interventions during free trial when restrictions of the FTS are always necessary to promote commercial software sales.

In summary, the FTS is especially important for the software firms' marketing campaign and understanding users' thoughts and behavior can help improve the effectiveness of the FTS practice. This study highlights the coping strategies which can promote the trial user to adapt to adverse trial situations (worse restrictions than expected) and further purchase it. We draw on the extant literature on expectation-disconfirmation and coping theory to conceptualize the impact of FTS restrictions on users' purchase decision making. More than half of the hypotheses are supported based on a longitudinal field experiment. Our findings suggest that higher negative disconfirmation on time restriction can elicit greater rational thinking, which in turn leads to higher level of action coping behavior. The conduct of action coping further positively influences a user's willingness to pay for the product. The findings of this research can contribute to the existing literature on FTS and points out the direction for future research to better address the doubts in such dynamic free trial process.

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Appendix A

Survey Instruments

1 = Strongly Disagree; 7 = Strongly Agree

Negative Disconfirmation on Time Restriction (NEDISTIME) (Bhattacherjee and Premkumar 2004)

1. Compared to my minimum expectation, the current time restriction designed for this FTS is much worse than expected.
2. I expected longer trial period to be provided compared with the time restriction attached with current FTS.

Negative Disconfirmation on Functionality Restriction (NEDISFUNC) (Bhattacherjee and Premkumar 2004)

1. Compared to my minimum expectation, the current functionality restriction designed for this FTS much worse than expected.
2. I expected less functional components to be disabled compared with the functionality restriction attached with current FTS.

Rational Thinking (RATHINK) (Duhachek 2005)

1. I tried to analyze the problem related to the FTS restrictions rationally before reacting.
2. I tried to be objective with the current situation of FTS restrictions.
3. I tried to control my emotions related to the FTS restrictions.
4. I tried to keep my emotions related to the FTS restrictions from controlling my FTS assessment actions.
5. I have tried to avoid acting rashly in response to the FTS restrictions.

Action Coping (ACCOP) (Duhachek 2005)

1. I tried to make a plan of action in order to resolve the problem that may be caused by the FTS restrictions.
2. I generated potential solutions to deal with the FTS restrictions.
3. I concentrated my efforts on resolving the negative trial outcomes that may be caused by the FTS restrictions.
4. I did what has to be done to achieve a successful FTS assessment with the presence of restrictions.

Willingness to Pay (WILLPAY)

1. Suppose you have enough money, how much are you willing to pay for the software you have just tried?

Appendix B

Demographics

Demographics (N = 120)					
Demographic Variables	**Category**	**Frequency (percentage)**	**Demographic Variables**	**Category**	**Frequency (percentage)**
Gender	Male Female	75 (62.5%) 45 (37.5%)	***Age***	19 and below 20 – 24 25 – 29 30 – 34	15 (12.5%) 53 (44.2%) 45 (37.5%) 7 (5.8%)
Highest Level of Education/ Highest Degree	High/Secondary School or Below Junior College or Pre-U Diploma Bachelor Master Doctorate Post Doctorate	8 (6.7%) 30 (25%) 11 (9.2%) 41 (34.2%) 25 (20.8%) 4 (3.3%) 1 (0.8%)	***Total Personal Income (for the year of 2005)***	≤ S$12000 S$12001 – S$24000 S$24001 – S$48000 S$48001 – S$60000 S$60001 – S$72000 ≥ S$72001	71 (59.2%) 18 (15%) 21 (17.5%) 6 (5%) 3 (2.5%) 1 (0.8%)
Industry	Computer Industry Construction and Engineering Education Entertainment Finance Manufacturing Medical and Legal Services Petroleum and Chemical Student Others	20 (13.6%) 4 (3.3%) 21 (17.5%) 1 (0.8%) 2 (1.6%) 7 (5.8%) 1 (0.8%) 1 (0.8%) 63 (52.5%) 4 (3.3%)	***Primary Occupation***	Consultant Educator/Trainer Electrical Engineer Project Manager R&D Personnel Senior Management Self-Employed Student Software Engineer System Administrator/Analyst Others	1 (0.8%) 9 (7.5%) 7 (5.8%) 1 (0.8%) 7 (5.9%) 1 (0.8%) 1 (0.8%) 73 (60.8%) 11 (9.2%) 7 (5.9%) 2 (1.7%)
Internet Usage	Several times per week One time per day Several times per day	8 (6.7%) 3 (2.5%) 109 (90.8%)	***Computer Proficiency Skills***	Modest Expert Absolutely Expert	63 (52.5%) 46 (38.3%) 11 (9.2%)
Different FTS Products ever Tried	None 1 to 2 3 to 4 5 to 6 7 to 10 11 to 14 15 or above	5 (4.2%) 13 (10.8%) 23 (19.2%) 17 (14.2%) 13 (10.8%) 2 (2.6%) 47 (39.2%)	***Post-Trial Software Purchase Experience***	Yes No	23 (19.2%) 97 (80.8%)