



# Rational or Emotional User: The Dual Processing Approach to Understanding Continuance Usage

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## ABSTRACT

Understanding why users continue or discontinue using specific technology is vital for its providers. Existing literature has explored the reasons for continuance and discontinuance by taking into account both rational and emotional factors. However, one question remains unanswered: Why do some users depend more on rational factors for decision-making, while others rely more on emotional factors? This study addresses this question by integrating cognitive decision-making styles and the fear of making incorrect decisions into traditional continued usage models. Data were gathered from 285 TV users and analyzed using structural equation modeling. The results demonstrate that the introduced constructs moderated the direct effects of rational and emotional factors. The contribution of the study lies in incorporating the underlying cognitive processes of decision-making. It presents two actionable variables that managers can utilize to categorize their customers and enhance the effectiveness of their use continuance strategies.

## KEYWORDS

Cognitive-Experiential Theory, Continuance, Decision Styles, Dual-Processing, Fear of Invalidity, TV

## INTRODUCTION

Understanding why individuals continue to use a particular technology or not has attracted great interest in the industry. Retaining customers is relevant because it affects profitability. Acquiring new clients can be more expensive than retaining existing ones due to the costs of finding new customers, establishing new relationships, and training new users. Moreover, consumers who bought technology and abandoned it after months of use may be reluctant to rebuy it (Bölen, 2020; Gallo, 2014). Because of this practical relevance, the continuance of usage has emerged as a prominent area of research in recent years (Bhattacharjee & Lin, 2014).

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Previous research on discontinuance has focused on finding different predictors to explain this phenomenon. Recent literature reviews reveal several theoretical lenses to explain this behavior, and these reviews also show a confluence of factors as the main predictors (e.g., usefulness, hedonic value, attitude, satisfaction, commitment) (Franque et al., 2020; Shaikh & Karjaluoto, 2015). Another view of prior research suggests two theoretical approaches to explain this phenomenon. The cognitive models (e.g., Theory of Reasoned Action or Theory of Planned Behavior) rely on perception, reasoning, and judgment (i.e., what a person thinks) to explain continuance. In this case, the logic would be that if the individuals perceive that they will benefit by performing a particular behavior, they will be more motivated to perform such conduct (Ajzen, 2005). On the other hand, the cognitive-affective models (Bhattacharjee, 2001; Kim et al., 2007) recognize that continuance decisions also have an affective component (i.e., how a person feels about it). In this case, when individuals employ an affective-based mechanism, they try to choose the behavior that offers a superior hedonic state (Kim et al., 2007; Osatuyi & Qin, 2018).

Advances in the field have provided an understanding of the main drivers of the phenomenon of interest. However, a question remains: Why do some individuals base their decisions more on rational factors than affective ones while others rely more on their feelings than their reasoning? (Hong et al., 2011; Trafimow et al., 2004).

Grounded in dual processing theories, some authors have shed some light on the cognitive mechanisms of the decision-making process to answer the previous question. In general, dual processing theories from the cognitive psychology field, particularly Cognitive Experiential Theory (CET) (Epstein, 2014), postulate that decision-making can be described as a function of an experiential type of information processing or Type 1 (fast, effortless, and affective) and another one rational or Type 2 (slow, effortful and logical). In the information systems (IS) arena, Gwebu et al. (2014) mention that while no explicit links had been established between dual processing theories and continuance research, they postulate that existing models implicitly represent experiential and rational processing types. The cognitive models center on reasoning and analysis and generally view continuance decisions as involving slower, effortful, and deliberate evaluation (Type 2 information processing). Thus, rational processing could underlie cognitive factors (e.g., perceived usefulness, cognitive attitude). Conversely, affective models recognize that these decisions are probably handled emotionally and more quickly (Type 1 information processing). So experiential processing could be behind affective factors (e.g., satisfaction).

Another vital contribution of dual processing theories is that they describe the underlying cognitive decision-making process. In brief, CET points out that individuals will try to optimize their cognitive resources (e.g., working memory, energy); therefore, by default, people will try to face decision-making using Type 1 processing (faster and with less cognitive effort). However, individuals will activate Type 2 processing (more demanding in time and cognitive effort) when they consider that the consequences or risks of the decision merit further reflection. Additionally, CET recognizes that individuals have different cognitive styles that may induce them to use one type of processing more than the other. Individuals with a preponderantly deliberative style will rely on Type 2, making a greater cognitive effort, while people with a markedly affective style will lean on Type 1 (Epstein, 2014; Evans, 2011).

In summary, CET opens the black box of the decisional process and may help answer why individuals draw more on rational than experiential factors or vice versa. However, according to the authors' review, no study in the IS field has empirically modeled and evaluated the decisional process postulated by this theory.

Based on the dual approach, this study aims to develop and evaluate an explanatory model to close this gap in the literature. The proposal starts from a cognitive-affective model: Technology Continuance Model (TCM) (Liao et al., 2009), which includes both a rational factor (cognitive attitude) and an experiential one (satisfaction) to explain continuance intention. The extended model introduces

the variable fear of invalidity – FOI (i.e., perception of the cost of an error of judgment) – and the cognitive styles as moderators of the direct relationships considered in TCM.

The model is evaluated in TV users because continuing or not with this service is currently a latent decision in this changing market. Television is still one of the biggest media markets in the world. The United States has the highest pay-TV penetration rates worldwide (Statista, 2021). According to Statista (2019), the incomes from pay-TV and television advertising represent the greater part of global media revenue. Nowadays, television service remains the primary source of content consumption, accounting for 64% of all time spent (Nielsen, 2021). However, streaming services are growing sharply, and TV cord-cutters have tripled since 2014 (Forbes, 2021).

This study extends our current knowledge from a theoretical perspective by establishing a connection between factor models, such as the TCM, and dual processing theories, like CET. The study shows how experiential processing is reflected in the influence of satisfaction on intention and rational processing is manifested when cognitive attitude affects intention. From a practical standpoint, introducing the variables of FOI and cognitive styles provides management with greater granularity to develop more targeted strategies for retaining users, specifically in the television market. For example, for users with a rational style, communication should focus on the benefits and technical features of the technology. For users with an affective style, providers should prioritize and maintain a positive user experience throughout all interactions, including product use, service, and maintenance.

The article is structured as follows: first, the theoretical background is presented, then the research model is developed; this is followed by an explanation of the method. Next, the results are presented, and finally, the findings are discussed.

## **THEORETICAL BACKGROUND**

### **Technology Continuance Model (TCM)**

Continued usage behavior is the long-term or sustained use of technology (Bhattacharjee & Lin, 2014, p. 1). Several theories have been developed to explain continuance (Liao et al., 2009). For example, the Expected-Confirmation Model (ECM) (Bhattacharjee, 2001) suggests that the intention to continue using technology has two proximal antecedents: satisfaction and perceived usefulness (Bhattacharjee, 2001) and one distal factor: expectation confirmation. Although the ECM is one of the most widely used models to explain this behavior (Hossain & Quaddus, 2012), it neglects a recognized relevant construct to predict intention: attitude (Ajzen, 2005; Liao et al., 2009). At the same time, Oliver (1980) proposed the Cognitive Model for Satisfaction Decision (CMSD) in marketing. In this work, satisfaction and attitude directly impact intention. Also, the Technology Acceptance Model (Davis et al., 1989) considers the direct effects of usefulness and attitude to predict behavioral intention.

Liao et al. (2009) compare the predictive power of these models; they conclude that CMSD has the greater explanatory power and show that satisfaction and attitude mediate the impact of usefulness and perceived ease of use, especially in the long term. Though attitude has an affective and a cognitive component (Ajzen, 2005), this study, emphasizing the separation between rational and experiential mechanisms, considers the cognitive component of attitude, similarly to other studies (e.g., Boers et al., 2018). Therefore, in the base model termed TCM, satisfaction and cognitive attitude directly impact the intention to continue.

In conclusion, existing literature has proposed several models to explain intention, with most models highlighting rational (e.g., cognitive attitude) and experiential (e.g., satisfaction) factors as the primary drivers of this phenomenon. However, these studies do not investigate why some users prioritize rational factors over experiential ones or vice versa, nor do they delve into the cognitive processes underlying these models, which could elucidate differences in decision-making.

Since the study aims to explore the role of the underlying cognitive processes (Type 1 and 2), this work focuses only on these proximal factors, one experiential and the other rational. Rather than including distal factors such as usefulness or confirmation, this study excludes them because they

are mediated by satisfaction and attitude (Liao et al., 2009). Furthermore, including these factors might detract from the study's focus.

## Cognitive Experiential Theory (CET)

The distinction between two types of thinking, one fast and intuitive and the other slow and reflective for carrying out tasks (e.g., decision making), is of ancient origin and is widespread in psychological writings (Evans & Stanovich, 2013).

Of the multiplicity of dual processing theories, the Cognitive-Experiential Theory (Epstein, 1994, 2014) could be the most appropriate on which to base the authors' study because CET integrates the experiential side (e.g., automatic, effortless, affective) with the rational side (e.g., analytical, intentional, effortful, and logical) (Epstein, 2014; Hodgkinson et al., 2009).

The *experiential type of processing* (Type 1) is responsible for processing large amounts of information rapidly and associatively, usually from everyday life experiences (Epstein, 1994, 2008; Epstein et al., 1996). It is considered an adaptive system, in part because of its long evolutionary history (Pacini & Epstein, 1999, p. 972). On the other hand, the *rational type of processing* (Type 2) focuses on the stimulus that requires an individual's conscious attention; in that way, this type implies a greater cognitive effort and slow information processing (Epstein, 1994; Epstein et al., 1996). Evolutionarily, it has a brief history in human cognitive processes (Pacini & Epstein, 1999, p. 972).

CET results in a relevant framework because of its extensive analysis and characterization of both types (Epstein, 1994, 2014). In particular, there are two distinguishing characteristics relevant to this study. First, both are motivated by different principles. The experiential type uses a *hedonic principle*, which implies a mediation of feelings on behavior: individuals behave accordingly to what makes them feel good and avoid behaviors related to negative feelings (Epstein, 2014, p. 14, 69). Conversely, the rational type uses a *reality principle*, which implies reason-oriented processing that generates beliefs through explicit and concrete sources of information (Epstein, 2008, p. 26; Epstein et al., 1996, p. 391). It is inferred that Type 1 learns through experience (reinforced by an emotional component), whereas Type 2 learns through logical inference (Epstein, 2008, p. 25).

Second, both types are mediated by different mechanisms. In the experiential type, behavior is mediated by feelings, ranging from full emotions to more subtle vibes. In this case, the conduct is adaptive because the feelings are based on unidentified, previous, similar experiences. That is, the person automatically extrapolates relevant events from the past to act. In contrast, in Type 2, when people attempt to solve problems, they use conscious appraisals and reason according to logic and evaluation of evidence (Epstein, 2014).

In summary, CET offers insights into the cognitive mechanisms underlying decision-making. This understanding could help explain why individuals prioritize rational or experiential factors in their decision-making processes. However, this approach has not yet been applied to explain continuance intention within the information system domain.

Overall, CET's insights can address TCM's limitations in explaining individual differences in decision-making. The following section integrates both research streams to answer the research question.

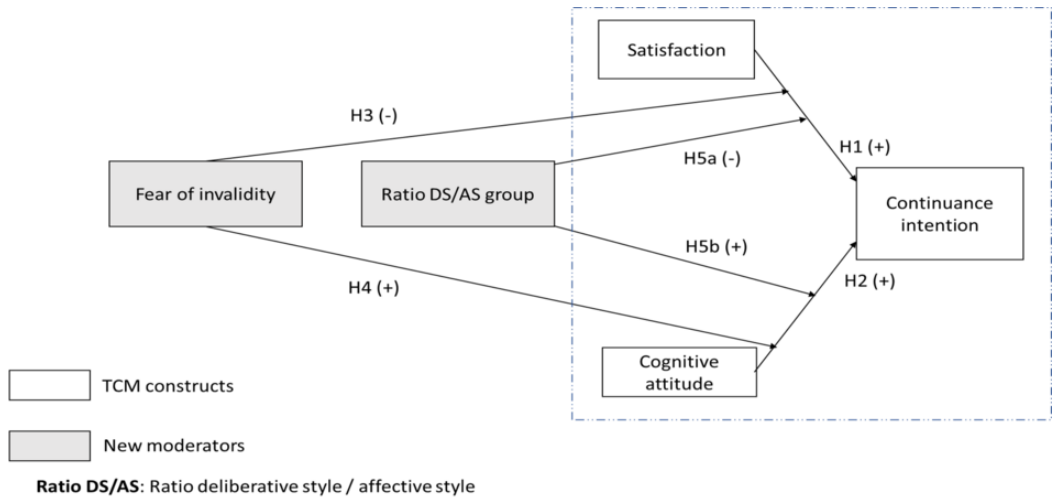
## RESEARCH MODEL

Figure 1 summarizes the research model based on TCM and the new moderating constructs.

### TCM and CET as Two Levels of Analysis

TCM and CET are theories of distinct levels of analysis but whose integration can shed more light on our understanding of the phenomenon under study. Gawronski et al. (2014) propose two tiers of analysis to give a deeper understanding of the role of dual processing theories. In the first one, called *computational*, the analysis provides a causal explanation about which stimuli would be associated

Figure 1. Research model



with a particular effect. Therefore, TCM would be at this level because it establishes the relationship between two causes, one affective (satisfaction) and the other cognitive (cognitive attitude), and a behavioral effect (usage continuance). In the second one, called *algorithmic*, the analysis transcends the causal explanation to focus on the mental mechanisms underlying the relationship between stimulus and effect. Dual processing theories (e.g., CET) would be at this tier, given that they explain how Types 1 and 2 operate and are linked to each other to understand behaviors.

As mentioned in the introduction, Gwebu et al. (2014) pointed out a correspondence between Types 1 and 2 and the affective (e.g., satisfaction) and cognitive (e.g., cognitive attitude) factors of causal models, respectively. However, these authors did not explain how the algorithmic level operates and its relationship to the computational level.

CET helps explain the continuance of usage when Type 1 operates. Following Epstein (1994, p. 716), Type 1 is assumed to be intimately associated with the experience of feelings (e.g., satisfaction). When a person responds to an event, the sequence of reactions is assumed to be as follows: Type 1 automatically searches its memory banks for related events, including their emotional accompaniments. The recalled feelings influence the course of further processing and reactions. If the activated feelings are pleasant, they motivate actions to reproduce these feelings again (i.e., continuance). If the feelings are unpleasant, they motivate behaviors to avoid these feelings (i.e., discontinuance).

On the other hand, Fazio (1990) can help explain continuance usage when Type 2 works. According to this author, rational processing is characterized by considerable cognitive work. It involves evaluating available information and analyzing positive and negative characteristics, costs, and benefits. Specific attributes (e.g., ease of use, price) of the attitude object (e.g., continued usage) and the possible consequences of undertaking a course of action (e.g., expected benefits) may be considered and weighed. This reflection forms the basis for deciding on a behavioral intention and, ultimately, a behavior.

In summary, although TCM and CET are at different levels of analysis, they explain the phenomenon under study, the former in terms of causal relationships and the latter in terms of the underlying mental processes. Moreover, there is concordance between the two levels of analysis. When in the TCM, satisfaction affects the continuance of use, Type 1 would be operating. Conversely, Type 2 would be working when the cognitive attitude impacts such behavior. This correspondence between both levels of analysis makes it possible to use the theoretical foundations of the dual approach to enrich TCM.

CET states that both types operate in parallel but independently of each other. Thus, each type of processing could contribute to behavior, varying from nothing to complete dominance by either one (Pacini & Epstein, 1999, p. 972). Given that satisfaction and cognitive attitude are manifestations at the computational level of Types 1 and 2, it would be expected that the effect of both factors on intention could also vary in the same range. Therefore, according to TCM and the dual approach:

**H1:** Satisfaction through Type 1 impacts positively on continuance intention.

**H2:** Cognitive attitude through Type 2 positively influences continuance intention.

According to the dual approach, the magnitude of the contribution of each type depends on factors related to individual differences (e.g., cognitive styles), motivational factors (e.g., decision importance, FOI), and situational factors (e.g., time available for decision making) (Epstein, 2014; Evans, 2011; Fazio & Olson, 2014). This study will explore the first two variables.

### **Fear of Invalidity (FOI) and TCM**

CET, like several theories of the dual perspective, postulates that an essential difference between the experiential and the rational type is that the former is less demanding of cognitive resources than the latter (Epstein, 2014, p. 19; Evans, 2011, p. 87). This difference is explained by the process each follows. The rational type is more demanding as it involves searching for or retrieving relevant information, considering specific attributes related to the behavior, and weighing the benefits, costs, and consequences of carrying out the behavior. The experiential type is effortless as it focuses on activating previous experiences in memory that may be relevant to triggering a behavior (Fazio, 1990; Fazio & Olson, 2014). Since the experiential type is less demanding and, therefore, more efficient in directing everyday behaviors, it is the type that is activated by default (Epstein, 2014, p. 19; Evans & Stanovich, 2013; Hodgkinson & Sadler-Smith, 2018; Stanovich, 2018).

Although several authors recognize that the experiential type is more efficient in using resources, it may be less effective because it often leads to errors, especially when the previous experience is inappropriate for the case addressed (Epstein, 2014, p. 19; Evans & Stanovich, 2013, p. 237). From this, a question arises, if the experiential type (more efficient but less effective) is activated by default, which factor leads the individual to activate the rational type (less efficient but more effective). These authors point out two factors; the first is the cognitive style (explored below), and the second is individuals' motivation to activate the rational type since they must compensate for the additional cognitive effort (Evans & Stanovich, 2013; Fazio, 1990; Fazio & Olson, 2014).

Several authors point out that the experiential type leads to a quick response; if the individual doubts that this is an effective (i.e., correct) response, they may be motivated to activate the rational type to reduce this uncertainty (Evans, 2011; Evans & Stanovich, 2013; Thompson et al., 2011). One of these motivators is fear of invalidity or the perception of the cost of an error of judgment. When costs are substantial, people are more cautious in their judgments. This caution would lead individuals to more thoughtful decisions, activating Type 2. Conversely, if FOI is low, as there is no incentive for additional cognitive effort, the individual will rely on the default response (Type 1) (Fazio, 1990, p. 92; Thompson et al., 2001, p. 20). Fazio and Olson (2014) and Thompson et al. (2011) summarize several experiments where they find that the intensity of this motivator leads to the adoption of one or the other type of processing.

The above discussion implies that at the algorithmic level, a lower FOI will activate the default processing type (experiential). When applying this notion to the computational level, satisfaction will significantly impact intention formation. Conversely, with a higher FOI, individuals will be motivated to invest more cognitive resources and rely on the rational processing type. In this case, satisfaction will play a reduced role.

Regarding cognitive attitude, the logic is reversed. A lower FOI corresponds to a less prominent role of cognitive attitude in shaping intention than a higher FOI. This line of thinking indicates that FOI is a moderating factor within the TCM model. Thus:

**H3:** Fear of invalidity moderates the effects of cognitive attitude on continuance intention positively.

**H4:** Fear of invalidity moderates the effects of satisfaction on continuance intention negatively.

## COGNITIVE STYLES AND TCM

As suggested, experiential and rational processing types determine individuals' course of action. Although each individual can adopt either type of processing to determine behavior, there is evidence that not everyone is equally inclined to both types. Instead, people have cognitive styles or preferences for some type: while some people tend to prefer to take their courses of action intuitively and based on feelings (affective style), others prefer to make decisions deliberately and reflectively (deliberative style) (Betsch, 2008, p. 231). Betsch and Kunz (2008, p. 533) suggest that people develop a preference for one style over time, depending on their learning experiences with each of them. Therefore, these preferences may influence the relative weight of each type of processing in determining behavior (Betsch, 2008, p. 231; Epstein et al., 1996; Evans, 2019; Mukherjee, 2010, p. 246).

At this point, the readers must distinguish between the types of processing – experiential or rational – with which human beings operate and the cognitive styles – affective or deliberative – which are preferences for one or the other type of processing (Evans, 2011).

Affective and deliberative cognitive styles are not poles of a single dimension but are two distinct dimensions. An individual could thus score high on one style and low on the other so that there is a marked preference for one style over the other. In contrast, other individuals do not have a marked cognitive style (Betsch, 2008, p. 235; Pachur & Spaar, 2015, p. 304). Various researchers have developed scales that capture these dimensions, assessing these styles within the dual approach (Betsch, 2008; Norris & Epstein, 2011; Scott & Bruce, 1995).

Empirical results in the dual approach literature show that individuals rely more on experiential or rational processing, depending on the affective or deliberative style (Betsch & Kunz, 2008; Raffaldi et al., 2012). For example, Betsch and Kunz (2008, p. 541) conducted a study in which participants were asked about their satisfaction (involving the experiential type) and cognitive attitudes (involving the rational type) about various everyday objects in an adult's life. They also measured cognitive styles. They found that a preference for the affective style corresponds with greater satisfaction (relative to the cognitive attitude). Likewise, a greater preference for the deliberative style is associated with a higher cognitive attitude. Also, Raffaldi et al. (2012) proposed to a group of students a business case that involved making a decision. Responses to the business case were used to classify decision-making approaches as experiential or rational. The results showed that affective style correlated positively with case scores that relied on the experiential processing type and negatively with those that relied more on the rational type. The opposite was true for the deliberative style.

The earlier discussion at the algorithmic level indicates that when individuals lean towards a deliberative style, they depend on rational processing. Translating this idea to the computational level, satisfaction assumes a lesser role in shaping continuance intention. In contrast, when individuals favor an affective style, they rely on the experiential processing type, where satisfaction takes on a more prominent role in forming continuance intention. In terms of cognitive attitude, the reasoning is inverted. Favoring an affective style corresponds to a less prominent role for cognitive attitude in shaping intention compared to favoring a deliberative style. This rationale implies that cognitive style acts as a moderating factor within the TCM model. Consequently:

**H5:** Cognitive style moderates the relationship between satisfaction and cognitive attitude on intention.

**H5a:** The impact of satisfaction on the continuance intention of the group with a predominantly deliberative style will be lower than that of the group with a preponderantly affective style.

**H5b:** The impact of cognitive attitude on the continuance intention of the group with a predominantly deliberative style will be greater than that of the group with a preponderantly affective style.

## METHOD

The proposed effects were assessed by collecting data through a questionnaire and analyzed through the partial least square technique (a well-known structural equation modeling method). According to Hair et al. (2019), this technique is appropriate when models have multiple indicators and constructs, complex relationships (e.g., moderators), and some issues with data distribution.

### Measurement

Measurement items from previous studies were adapted to ensure the content validity of the instruments (Straub et al., 2004). The phrasing of the items was adapted to fit the TV-service context. Appendix A displays the measurement items and their sources. All constructs were measured using multiple items on a seven-point scale. Appendix A also contains the complete scales for each of the measures, whether Likert or semantic differential.

Some items were discarded based on discriminant validity issues consistent with previous literature on the psychometric properties of attitudinal variables (Batra & Ahtola, 1991).

Following literature recommendations, the subsequent procedures were directed at designing the questionnaire to alleviate the potential effects of common method bias (CMB) (Podsakoff et al., 2012). The measures of the predictor were separated from the independent variables. Several scale types (e.g., Likert, semantic differential) and anchor labels (e.g., agree/disagree, frequency, unlikely/likely) were used to reduce the perception of similarity between measures. Likewise, the questions were presented by interspersing items from the different independent variables.

Since this study aims to assess the moderating role of decision styles, it is essential to measure the preference for each style. As previously mentioned, decision styles are not a continuum but two distinct dimensions. Consequently, various situations can emerge (e.g., high affective-high deliberative, high affective-low deliberative, low affective-high deliberative, low affective-low deliberative). Using a quotient to evaluate the preference is a suitable option in this context. A high quotient indicates a preference for the rational style over the affective one, while the opposite suggests a preference for the affective style. However, medium values imply no strong preference for either style, which can result from different score combinations (e.g., high-high, low-low, medium-medium).

Furthermore, the analysis should focus on the extreme groups, as previous studies have recommended this approach to detect differentiated effects (Betsch, 2008; Betsch & Kunz, 2008). This procedure seems reasonable because if the objective is to evaluate the difference due to the preference for one style or another, this would be achieved more clearly by comparing the cases where this preference is notorious. In the group with an intermediate quotient, there is simply no preference.

Appendix B shows the descriptive statistics of both styles and their ratio.

### Data Collection

Data were captured from adult American TV users through Amazon's Mechanical Turk platform (MTurk). This platform is helpful for studies that do not require particular expertise from respondents and need the participation of many respondents (Lowry et al., 2016). Recent studies show that introducing certain practices can preserve the reliability of MTurk-based surveys (Aguinis et al., 2021; Chmielewski & Kucker, 2020). Even more, leading journals have lately published papers using this platform (e.g., Salo et al., 2020; Sun et al., 2020).



Following recent recommendations to ensure the quality of the data (Aguinis et al., 2021; Edwards, 2019; Lowry et al., 2016), MTurk options were customized to obtain only respondents residing in the United States who presented good records of task completion in the platform (at least 98%) and who had carried out at least 500 tasks on the platform. SurveyMonkey options avoided more than one response from the same IP address. Equally, the questionnaire's introduction explained the relevance of paying attention to the questions and the scientific nature of the study. Moreover, participants were notified that the answers would be analyzed anonymously to decrease social desirability bias; and that the responses would be scrutinized, rejecting invalid responses. Also, three attention check questions were included in the questionnaire and one captcha verification to stop bots. The payment was established according to US minimum wage laws for garnering standard respondents.

The authors created the survey using SurveyMonkey and posted it on MTurk, allowing workers of this platform to access and complete it. Data collection was conducted during the first half of 2021. Upon completion, the researchers retrieved the data from SurveyMonkey and issued payments to the participants through MTurk.

## **DATA ANALYSIS AND RESULTS**

### **Sample Characteristics**

A power analysis was run to determine the required sample size, as suggested by Sarstedt et al. (2022). The gamma-exponential method indicates a sample size of 146 observations (Kock & Hadaya, 2018). After excluding incomplete and careless responses, 285 valid responses were included in the analysis. Therefore, the sample size collected was sufficiently large.

Table 1 displays the sample characteristics. The sample was composed of 51.6% males and 48.4% females. Most participants were in the middle age range and used TV service for an average of 2 hours per day. Finally, more than 50% of the respondents had had a TV subscription for more than six years.

## **RESULTS**

This study employed WarpPLS software for the analysis. An analysis is carried out with the complete sample to evaluate hypotheses H1, H2, H3, and H4. Then, a multi-group analysis is performed to evaluate the moderation effects of cognitive styles (H5).

### **Measurement Model Evaluation**

According to the recommended thresholds (Hair et al., 2021; Sarstedt et al., 2022), the measurement model was evaluated through reliability and convergent and discriminant validity. Composite reliability (CR) and Cronbach's alpha of all items were greater than the suggested value of 0.7, showing internal consistency, as shown in Table 2. The average variance extracted AVE values were greater than 0.5, and standardized factor loadings were higher than 0.7 and significant, verifying convergent validity, as seen in Table 2. Also, the discriminant validity is corroborated since all HTMT values are less than 0.85, as seen in Table 3.

Finally, Harman's single-factor technique evaluated common method bias (CMB). The single un-rotated extracted factor accounted for 38% of the variance, below the 50% cut-off. Consequently, it is improbable that CMB is a significant matter.

### **Hypothesis Testing: Complete Sample**

Table 4 shows that the paths derived from TCM (SAT-> CI and CA ->CI) were statistically significant; thus, H1 and H2 were supported empirically. Conversely, the expected moderating effects of FOI were not supported for the complete sample. The explained variance of continuance intention was 40% for the entire sample.

Table 1. Sample characteristics

Respondents		n= 285	
		Frequency	Percent (%)
Age	21-25	8	2.8
	26-30	25	8.8
	31-35	47	16.5
	36-40	58	20.4
	41-45	29	10.2
	46-50	29	10.2
	51-55	25	8.8
	56-60	24	8.4
	> 60	40	14.0
Gender	Female	138	48.4
	Male	147	51.6
Time spent per day	< 10 min	2	0.7
	10-30 min	12	4.2
	31-60 min	39	13.7
	2 hours	86	30.2
	3 hours	53	18.6
	4 hours	32	11.2
	> 4 hours	61	21.4
Subscription time	1 year or less	29	10.2
	2 years	34	11.9
	3 years	39	13.7
	4 years	27	9.5
	5 years	13	4.6
	> 6 years	143	50.2

Table 2. Composite reliability (CR), Cronbach's alpha, average variance extracted (AVE), and range of factor loadings

Variable	CR	Cronbach's Alpha	AVE	Range of Factor Loadings
Continuance intention (CI)	0.985	0.986	0.960	0.981-0.969
Cognitive attitude (CA)	0.942	0.907	0.902	0.998-0.804
Satisfaction (SAT)	0.974	0.964	0.844	0.996-0.814
Fear of invalidity (FOI)	0.943	0.908	0.845	0.940-0.895

### Hypothesis Testing: Multi-Group Analysis

According to the procedure explained in the method section, the sample was divided into three groups according to the ratio deliberative/affective style: High ratio (n = 91), medium ratio (n= 103), and low

**Table 3. Heterotrait-Monotrait ratio of correlations (HTMT)**

Variable	CI	CA	SAT	FOI
CI	-			
CA	0.633	-		
SAT	0.570	0.738	-	
FOI	0.051	0.21	0.046	-

Note: CI: Continuance intention, CA: Cognitive attitude, SAT: Satisfaction, FOI: Fear of invalidity.

**Table 4. Results of complete sample and hypotheses evaluation**

Path	Coefficient	p-Value	Hypothesis Evaluation	
SAT -> CI	0.284	0.001	H1	Supported
CA -> CI	0.406	0.001	H2	Supported
SAT*FOI -> CI	-0.059	0.156	H3	Not supported
CA*FOI -> CI	0.059	0.156	H4	Not supported

Note: CI: Continuance intention, CA: Cognitive attitude, SAT: Satisfaction, FOI: Fear of invalidity.

ratio (n = 91) to evaluate the moderating effects of cognitive styles. Also, the multi-group analysis was performed with the high and low ratio groups.

The first step in the multi-group analysis is the evaluation of the invariance of the measurement model. This evaluation will rule out that the difference between groups is due to the measurement model instead of the structural model. The study ensured that each measurement model employed equal indicators and scales across groups, identical data treatment (e.g., coding), and similar algorithms settings (Hair Jr et al., 2021). Also, equivalent weights of measurement models have been confirmed since p-values of the test of weight differences are greater than 0.1 for all indicators (Kock, 2014).

Table 5 shows that the paths derived from TCM were statistically significant for high and low-ratio groups; however, the results indicate a large difference in the coefficients of both groups (0.239 and 0.226). Moderating effects of cognitive styles have been supported (H5a and H5b) since p-values of the test of coefficient difference are significant at 0.05 level. Although the moderation of FOI was not supported for the complete sample, results indicate the moderating role of fear on invalidity in the low-ratio group (people with a preponderantly affective style) since p-values are significant at 0.05

**Table 5. Results of the multi-group analysis and hypotheses evaluation**

Path	Low Ratio Group (More Affective)		High Ratio Group (More Deliberative)		Variation Between Groups		Hypothesis Evaluation
	Coefficient	p-Value	Coefficient	p-Value	Absolute	p-Value*	
SAT -> CI	0.427	0.001	0.188	0.026	0.239	0.039	H5a supported
CA -> CI	0.282	0.002	0.508	0.001	0.226	0.044	H5b supported
SAT*FOI -> CI	-0.174	0.031	-0.046	0.344	0.128	0.185	H3 partially supported (Low ratio)
CA*FOI -> CI	0.149	0.048	0.001	0.476	0.148	0.152	H4 partially supported (Low ratio)

Note. (\*): p-values were estimated by calculating pooled standard error (Kock, 2014). CA: Cognitive attitude, CI: Continuance intention, SAT: Satisfaction, FOI: Fear of invalidity.

level. Thus, H3 and H4 are supported partially. The explained variance of continuance intention was 41% for the low-ratio group and 46% for the high-ratio sub-sample.

## DISCUSSION

In view of the high costs involved in gaining or losing clients, a relevant issue for the industry is that its customers continue using a given technology instead of abandoning it. To explain this phenomenon, traditional models have considered rational factors such as usefulness or cognitive attitude and affective factors such as satisfaction. However, it is observed that some users give greater weight to rational factors than to affective factors in their decision-making and others do the inverse. This differentiated preference has not been sufficiently explained in the literature. To tackle this knowledge gap, this study draws on dual processing theories to explore the cognitive mechanisms underlying user decision-making. According to this approach, individuals rely on two processing types: Type 1 or experiential (e.g., effortless and fast), which relies on feelings, and Type 2 or rational (e.g., effortful and slow). The first is the default processing type due to being less cognitively demanding but is less effective (sometimes leading to mistakes). Also, the literature recognizes two styles of information processing: affective (tendency to make decisions based on feelings or activating Type 1) and deliberative (tendency to behave thoughtfully or using Type 2). Thus, matching IS literature and the dual approach, this study suggests that the experiential type would be activated when satisfaction impacts continuance intention and the rational type would operate when the cognitive attitude influences said intention. This work, grounded in the dual processing approach, introduces fear of invalidity (FOI) and cognitive styles as moderators of the direct effects of cognitive attitude and satisfaction on continuance intention. This study aimed to theorize and empirically evaluate these effects. The central finding of the research shows empirical support for these moderations.

Specifically, the results show that the traditional TCM holds since hypotheses H1 and H2 find empirical support. These findings are consistent with previous empirical studies in the IS field (Bhattacharjee & Lin, 2014; Liao et al., 2009) and establish a good starting point to evaluate the moderating effects proposed in this study.

The moderating role of FOI is grounded in the fact that the high cost of making a mistake motivates individuals to activate rational processing instead of following the experiential type (the default but less accurate one). This activation implies striving to evaluate the alternatives more consciously (Shin, 2009) and reflecting on the consequences of their decision (Fazio, 1990). Therefore, depending on the degree of FOI, the individual puts more weight on cognitive attitude or satisfaction. The results show that although the moderating effects (H3 and H4) are not supported for the whole sample, evidence is found for the group with a preponderantly affective style. A possible explanation for this partial support is that in the deliberative style group, people initially might have a disposition for rational processing instead of the default processing (experiential). Hence, they are possibly already willing to take on the additional effort required by Type 2, regardless of the degree of FOI. Individuals from the affective style group, for their part, have the experiential processing disposition by default. However, if FOI is very high, they could be motivated to invest a greater cognitive effort and switch to rational processing.

The partial support for hypotheses H3 and H4 indicates that they may require refinement. The enhanced ones can be expressed as follows: H3 states that fear of invalidity positively moderates the effects of cognitive attitude on continuance intention but only for predominantly affective users. H4 posits that fear of invalidity negatively moderates the effects of satisfaction on continuance intention, again only for predominantly affective users. While a potential explanation has been offered earlier, these refined hypotheses should be examined further in future studies.

On the other hand, the moderating role of the information processing style is based on the premise that the individual prefers one style over the other and exhibits a relatively consistent tendency (McLaughlin et al., 2014; Wittman et al., 2009); therefore, depending on the predominant style, more

weight is placed on satisfaction or cognitive attitude. The results support both moderating effects (H5a and H5b). This result does not seem unexpected for the group with a preponderantly affective style. As mentioned before, the default type of processing is the experiential one; therefore, the affective style would only reinforce the activation of Type 1 and give more weight to satisfaction for this group as compared with the other one. On the other hand, this result is not evident for the deliberative style group. Possibly it indicates that once a strong tendency for this style is generated in the individual, the default processing is no longer Type 1 but Type 2; therefore, the cognitive attitude would have more weight for this group in decision-making. In the latter case, processing would be more related to the individual's formal learning (Samson & Voyer, 2012), where the most significant importance falls on knowledge about the benefits of the technology.

### **Implications for Theory**

Traditional models focus on affective and rational factors to explain the continued use of technology. This study further explains why some individuals rely more on affective factors and others on rational factors to decide whether to continue use. To this end, firstly, this study reveals a link between factor models (e.g., TCM) and the types of processing postulated by dual processing theories (e.g., CET). Along these lines, the activation of experiential processing would be reflected in satisfaction acting on intention, and rational processing would be manifested when the cognitive attitude affects intention.

Secondly, since the link between CET and TCM has been established, this study transfers the cognitive mechanisms underlying the decision-making process, well studied by the dual approach, to the TCM. In this line, the study introduces these mechanisms through two new constructs (fear of invalidity and cognitive styles) as moderators in the TCM. These moderators would explain the differences in decision-making noted above. Cognitive styles are individual differences that imply an initial preference to use one type of processing. In contrast, FOI is a perception generated in the individual associated with the nature and context of the decision that would lead to one type of processing or another.

Thirdly, this work emphasizes the role of individual differences to explain this phenomenon. The study's focus on cognitive styles as a moderator highlights the importance of considering individual differences when examining technology continuance intention. This insight can inform future research to investigate other individual differences that may play a role in shaping technology continuance behavior, ultimately improving our ability to predict and support users' technology usage decisions.

Overall, this work highlights the dynamic nature of decision-making of continuance. The study underscores that decision-making processes are not static but rather influenced by various factors, such as individual cognitive styles and contextual elements like fear of invalidity. By integrating these moderators into the TCM, the study sheds light on the dynamic nature of decision-making, allowing for a more accurate representation of how users make choices regarding technology use.

### **Implications for Practice**

On the one hand, providers could generate groups under the two cognitive styles and develop particular strategies for each. For those with a rational style, communication should emphasize the benefits provided and the differential technical characteristics, as these will have more weight in forming the attitude and, subsequently, the decision to continue using that technology. For TV users, the advantage of a broader content offer, and exclusive shows, could be good arguments for this group. For customers with a more affective style, the provider should prioritize and take care of the service experience in all user interactions. For example, they can include improving the user interface of their TV services, offering personalized content recommendations, and providing exceptional customer support. Also, the fulfillment of offers should be taken care of since these generate expectations linked to the formation of satisfaction (Oliver, 1980).

The fear of invalidity manifests itself when individuals know the consequences of a wrong decision (i.e., abandonment of the technology) or perceive them to be very costly. These costs can

be economical (e.g., the loss of a discount or the costs of installing a new technology), emotional (e.g., attachment to particular content or the brand itself), or cognitive (e.g., the effort of searching for a technological alternative or learning to use new technology) (Ray et al., 2012). Therefore, a user retention strategy could focus on periodic communication (to raise the fear of invalidity) that abandoning the technology would entail costs such as those mentioned above. For example, providers can highlight the potential costs of switching from traditional TV to streaming services, such as the loss of specific channels or content, increased difficulty in navigating multiple streaming platforms, or the need to purchase additional equipment or faster internet connections. By emphasizing the negative consequences of making a wrong decision, providers can increase the fear of invalidity and potentially discourage users from migrating to streaming services. Moreover, providers can offer customer loyalty programs that reward long-term TV subscribers with exclusive benefits, discounts, or access to unique content. By doing so, they create an emotional attachment to the traditional TV service, which can increase the fear of invalidity as users would not want to lose these benefits by switching to streaming services.

Likewise, FOI can help discourage a client who has initiated the procedure of abandoning technology from doing so. In this case, service centers should be prepared to highlight the cost of abandonment to users so that they reflect on the matter and are eventually discouraged.

## **LIMITATIONS AND FUTURE STUDIES**

First, the data were collected from a single country, the United States, under a predominantly Western culture; however, cognitive styles may vary by culture. Some cultures favor rationality, while others emphasize intuition or emotions (Iannello et al., 2011). Future studies could explore the proposed model considering these cultural differences. Second, although the model could be used for both hedonic and utilitarian technologies, the data has been collected from television users, a more hedonic technology. Some studies have shown that the influence of rational or affective factors may have some relationship with the type of technology (Wu & Lu, 2013). Therefore, future research could investigate the application of the model to utilitarian technologies.

Finally, the presence of rational and affective factors in the decision of continued usage (or not) is not unique to information systems; cognitive styles and fear of invalidity could play a relevant role in decision-making in other similar phenomena. Models that explain the intention to disclose personal information where emotional factors have recently been considered in addition to the well-known rational calculus (benefits vs. risks of disclosing) (Kehr et al., 2015) are good examples. Future studies could use the theoretical foundations of this study to explore its relevance to other phenomena in the field.

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The authors of this publication declare there is no conflict of interest.

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## APPENDIX A

### Measurement items

Construct	Source	Item Wording
<b>Continuance Intention (Bhattacharjee &amp; Lin, 2014)<sup>a</sup></b>		
CI01		I plan to continue using TV-SERVICE in the coming months
CI02		I intend to continue using TV-SERVICE in the coming months
CI03		My intentions are to continue using TV-SERVICE in the coming months
CI04		I think I will continue using TV-SERVICE in the coming months
<b>Satisfaction (Bhattacharjee, 2001)<sup>c</sup></b>		
SAT1		How do you feel (satisfied - dissatisfied) about your experience of TV-service?
SAT2		How do you feel (pleased - displeased) about your experience of TV-service?
SAT3		How do you feel (contented - frustrated) about your experience of TV-service?
SAT4		How do you feel (delighted - terrible) about your experience of TV-service?
<b>Cognitive Attitude (Batra &amp; Ahtola, 1991; Shin, 2009)<sup>a</sup></b>		
ATT2		I consider that using TV-SERVICE is useful to me
ATT5		I consider that using TV-SERVICE is beneficial to me
ATT6		I consider that using TV-SERVICE is a wise idea
<b>Fear of Invalidity (Thompson et al., 2001)<sup>b</sup></b>		
FI01		How likely is it that you would be worried about making a mistake?
FI02		How probable is it that you would continue to think about the pros and cons to make sure that you have not been wrong?
FI03		How likely is it that you would doubt if this decision has been correct?
FI04		How probable is it that you would continue to evaluate if this decision has been correct?
<b>Deliberative Style (Betsch &amp; Kunz, 2008; Scott &amp; Bruce, 1995)<sup>a</sup></b>		
If you had to decide whether or not to continue using TV-SERVICE:		
RS01		I would make this decision by thinking carefully
RS02		I would make this decision through a structured approach
RS03		Before making this decision, I would think it through
RS04		Prior to making this decision, I would analyze each alternative in detail
RS05		I would make this decision in a rational manner
RS06		I would make this decision weighing all pros and cons
<b>Affective Style (Betsch &amp; Kunz, 2008; Scott &amp; Bruce, 1995)<sup>a</sup></b>		
If you had to decide whether or not to continue using TV-SERVICE:		
AS01		It would be more important for me to feel this decision is right than have a rational reason for it
AS02		I would make this decision by trusting my inner feelings
AS03		I would make this decision by following what is in my heart
AS04		I would make this decision by relying on my feelings
AS05		My feelings would play an important part in this decision

*Note.* <sup>a</sup>Scale: Strongly disagree ... Strongly agree; <sup>b</sup>Scale: Unlikely ... Likely; <sup>c</sup>Scale: Very dissatisfied ... Very satisfied // Very displeased ... Very pleased // Very frustrated ... Very contented // Very terrible ... Very delighted

## APPENDIX B

### Decision styles statistics

	Media	Standard Deviation	Range
RatioProm	1.53	0.84	6.43
Deliberative style (*)	5.96	0.75	3.33
Affective style (*)	4.57	1.48	6.00

Note. (\*) Obtained as the average of the scores of the items.

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