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# Ambivalence and Coping Responses in Post-Adoptive Information Systems Use

(Accepted Version)

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**ABSTRACT:** As information systems (IS) have evolved, more sophisticated meshing of their positive and negative implications has emerged, leaving users with an increasingly ambivalent experience. Given the discomfort of ambivalence, users intrinsically engage in coping responses with different degrees of cognitive flexibility. This paper investigates ambivalence and the coping responses users adopt in the context of post-adoptive IS use via two research questions: (1) what are the consequences of flexible and inflexible coping responses to ambivalence toward post-adoptive IS use? and (2) how does personality influence a user's disposition toward flexible and inflexible coping responses to ambivalence toward post-adoptive IS use? To address them, we propose and test a research model using a multimethod design, comprising two complementary empirical studies. Study 1 adopts a variable-centered approach to test the hypotheses and to empirically validate the proposed research model. Building on the findings of Study 1, Study 2 employs a person-centered approach to identify a prototypical typology of IS users. The findings demonstrate the prevalence of ambivalence among IS users, the dual-nature of their coping responses to ambivalence, in part, influenced by their level of neuroticism, and the associated post-adoptive IS use behaviors. This paper provides a novel perspective to users' attitudes toward an IS use and resolves some of the tensions in prior ambivalence research.

**KEYWORDS:** ambivalence, post-adoptive IS use, coping, cognitive flexibility, neuroticism, social networking sites, user profiles.

## INTRODUCTION

Contemporary information systems (IS), such as social, mobile, and intelligent IS, have become more complex and pervasive with an array of intended and unintended consequences for users. This has made IS use more of an ambivalent experience—i.e., a mix of positive and negative—rather than a univalent (i.e., uniformly positive or negative) experience for users. *Ambivalence* is a state of mind that occurs when an individual simultaneously experiences positive and negative orientations toward an object, manifested in having mixed thoughts and feelings or a love and hate relationship with it at the same time<sup>1</sup> [3, 56]. Ambivalence appears to be quite common in our experience of many contemporary IS [17, 66]; we often like some aspects of IS use, but are critical and wary of other aspects of it. Case in point, Pew Research Center’s recent survey on social media use shows that:

*“On one hand, the rapid growth of the [social media] platforms is testimony to their appeal to online Americans. On the other [hand], this widespread use has been accompanied by rising user concerns about privacy and social media firms’ capacity to protect their data. All this adds up to a mixed picture about how Americans feel about social media. ... The paradox is that people use social media platforms even as they express great concern about the privacy implications of doing so – and the social woes they encounter. ... Some of the answers about why people stay on social media could tie to our findings about how people adjust their behavior on the sites and online, depending on personal and political circumstances. ... In other words, participation on the sites for many people is not an all-or-nothing proposition.”* [60]

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1. Ambivalence is a unique phenomenon that is conceptually different from cognitive dissonance. See Appendix A for discussion of these differences.

Social networking sites (SNS) are not the only example of a context that is prone to ambivalence; ambivalence has been reported in users' experience with other types of contemporary IS, such as mobile devices [38], online review platforms [59], electronic medical records (EMR) [62], and other work systems [70]. It therefore appears to be fairly common among IS users, and despite their ambivalence, many try to continue using the system by adjusting IS use behaviors. Nonetheless, ambivalence toward IS use and its influence on user behavior is poorly understood. Specifically, our review of extant IS studies on ambivalence (see Appendix B) suggests that this research is at its embryonic stage. Although the extant studies have alluded to the possibility of the simultaneous presence of positive and negative (mixed) orientations toward IS use (e.g., [45, 70]), they are rather limited in their conceptualization of the notion of ambivalence experienced by users toward IS use and, more importantly, the various ways in which users may choose to cope with ambivalence and the plausible IS use behaviors associated with their coping responses. This paper strives to ameliorate this gap.

Addressing this gap is important for two reasons. First, IS use can lead to different individualized experiences and views among users that fuel mixed attitudes and emotions (i.e., ambivalence), which can in turn shape users' subsequent attitudes and behaviors toward IS use [27, 70]. This is more important in the post-adoptive stage of IS use (compared to pre- and early adoption stages), where users engage in deeper and more extensive use of IS affordances, sometimes beyond the terms of use intended by the designers [10, 28]. The post-adoptive stage of IS use enfolds intended as well as unintended behaviors, with a mix of positive and negative consequences for users [28, 76], which can make ambivalence more plausible. Second, ambivalence can lead to markedly different psychological and behavioral outcomes [27, 70], depending on the extent of cognitive flexibility manifested in users' coping responses to

ambivalence [64, 65]. Inflexible coping responses often involve one-sided responses to ambivalence in a rash attempt to avoid or evade its discomfort [54, 64, 65]. By contrast, flexible coping responses entail more balanced and holistic considerations of both (positive and negative) sides of the object of ambivalence that can result in more adaptive behavioral outcomes [3, 20, 61, 64, 65]. Nevertheless, despite the plausibility of ambivalence, especially in the post-adoptive stage, extant IS research has largely overlooked various ways in which users may flexibly or inflexibly cope with it; why they may show different coping responses; and the impacts of the different coping responses on post-adoptive IS use behaviors.

In this paper, we strive to address these gaps by investigating the consequences of flexible and inflexible coping responses to ambivalence in the post-adoptive stage, and examine the role that users' personality plays in different coping responses. While different factors may influence a user's disposition toward a coping response to ambivalence, we specifically focus on the role of personality, given its stability and importance for predicting how people deal with unpleasant states and stressors such as ambivalence [64]. These objectives are manifested in two research questions:

*(RQ1) What are the consequences of flexible and inflexible coping responses to ambivalence toward post-adoptive IS use?*

*(RQ2) How does personality influence a user's disposition toward flexible and inflexible coping responses to ambivalence toward post-adoptive IS use?*

To investigate these research questions, we develop a conceptual framework that explains users' flexible and inflexible coping responses to ambivalence, the plausible post-adoptive IS use behaviors associated with these coping responses, and the role of a key personality trait, namely *neuroticism*, toward flexible and inflexible coping responses. Building on this conceptual

framework, we propose a research model comprising 13 hypotheses. We employ a multimethod, dual-study design using samples of SNS users. Study 1 ( $n_1 = 318$ ) empirically validates the proposed research model using covariance-based structural equation modeling (SEM). The results portray the dual nature (i.e., flexible and inflexible) of coping responses to ambivalence, the post-adoptive IS use behaviors associated with different coping responses, and the important role of neuroticism in influencing IS users' disposition toward flexible and inflexible coping responses. Building on Study 1's findings, Study 2 ( $n_2 = 299$ ) uses a three-step latent profile analysis (LPA) to present a typology of IS users. Study 2 results confirm the dual-nature of coping responses to ambivalence and their importance in predicting IS use behaviors.

## **CONCEPTUAL FRAMEWORK**

### **Ambivalence, Coping Responses, and Behavioral Outcomes**

Due to the inconsistency embedded in having oppositional attitudes, ambivalence, even small level of it, is unsettling and disturbing [3, 49, 79]. Failure to reduce or resolve ambivalence can result in “disorientation”, illustrated by “a sense of loss of bearings or a sense of disequilibrium and that something is not right for the person describing the experience of having more than one feeling [toward an object]” [22, p. 100]. In response, people are intrinsically motivated to engage in *coping efforts* as a means to reduce the psychological discomfort of ambivalence and to resolve its root causes [3, 49, 54, 79].

Coping efforts can be conscious or subconscious [16]. Subconscious coping efforts (also referred to as “defense” efforts [3]) are reactive and often unintentional responses that alter the individual's perception of the reality. They are automatically executed to shield the individual from excessive discomfort, whether the source of that discomfort is the perception of an unsettling external event, or the experience of a disruptive internal state such as ambivalence

[16]. By contrast, conscious coping efforts are reflective, purposeful, and intentional responses aimed at resolving an underlying problem (i.e., “problem-focused” coping efforts) or alleviating the tension and anxiety resulting from the problem (a.k.a., “emotion-focused” coping efforts) [16]. In this paper, we generally refer to individuals’ coping efforts in response to ambivalence as *coping responses to ambivalence*, defined as conscious or subconscious efforts to reduce the salience of ambivalence. This can happen by reducing its tensions, or resolving underlying problems, which may involve cognitions, emotions, and behaviors [3]. As indicated by arrow 1 in the conceptual framework (Figure 1), ambivalence can stimulate different coping responses [3, 49]. These coping responses are associated with different post-adoptive IS use behaviors (arrow 2 in Figure 1) [70]. The coping responses and their associated post-adoptive IS use behaviors aim to reduce or resolve ambivalence (arrows 3 and 4 in Figure 1).

#### **FIGURE 1 APPEARS HERE**

Depending on the extent of *cognitive flexibility* manifested in them, coping responses to ambivalence and their associated post-adoptive IS use behaviors can differ [65]. Cognitive flexibility is defined as “the ease with which individuals are able to broaden the scope of their attentional span to attend to divergent perspectives but also engage in a balanced consideration of those perspectives” [64, p. 260]. *Inflexible coping responses to ambivalence* entail one-sided, narrow thinking, and biased responses to ambivalence that are at the low end of the cognitive flexibility continuum. Prior research demonstrated that individuals turn to inflexible coping responses to ambivalence in an often-rash effort to avoid or evade the discomfort of ambivalence, and the negative feelings it produces [54, 64, 65]. These inflexible coping responses manifest themselves in different ways, such as response amplifications [6] and indecision [80], that are often associated with maladaptive behavioral outcomes [65]. By

contrast, flexible coping responses to ambivalence involve cognitive breadth, considerations of multiple perspectives, and adaptive and creative ways to cope with ambivalence [20, 61, 65] that are at the high end of the cognitive flexibility continuum. High cognitive flexibility embedded in this type of coping response is integral to adaptive behavioral outcomes from ambivalence [64, 65]. Therefore, depending on the extent of cognitive flexibility manifested in the coping responses to it, ambivalence can be linked to markedly different behavioral outcomes.

While both flexible and inflexible coping responses to ambivalence are plausible, there are personal and situational *contingency factors* that can moderate an individual's disposition toward flexible or inflexible coping responses [64, 65, 77] (arrow 5 in Figure 1). These moderators can determine the nature of users' coping responses to ambivalence (i.e., flexible versus inflexible responses). Prior research on ambivalence (e.g., [64, 65]) proposed that a key personality trait—*neuroticism*—can be a contingency factor, and could moderate the extent of cognitive flexibility exercised in coping with ambivalence. Neuroticism represents the tendency to exhibit poor psychological adjustments and experience anxiety in stressful situations [29]. With this trait, even minor discomforts are viewed as hopelessly difficult, and the users' tendency to flexible responses is reduced [64, 65]. This personality trait can therefore move the needle toward inflexible coping responses to ambivalence by biasing the interpretation of ambivalent situations as threatening [64, 65]. As such, neuroticism is deemed to be an influential contingency factor in determining inflexible, versus flexible, coping responses to ambivalence.

### **Ambivalence in Post-Adoptive IS Use Stage**

While ambivalence can be experienced at different stages of an IS adoption, in this paper we focus on ambivalence in the *post-adoptive IS use* stage. The post-adoption stage involves updated perceptions and attitudes based on users' experience of IS, which determine patterns of

IS use behaviors and user satisfaction and dissatisfaction with the IS [33]. Importantly, post-adoptive IS use can encapsulate a mix of positive and negative experiences with IS for users [28, 76], which increases the likelihood of experiencing different degrees of ambivalence [70]. In addition, it is important to study ambivalence in the post-adoptive IS use stage, because the flexible and inflexible coping responses users employ to cope with their ambivalence can explain different behaviors toward IS [70] (arrow 2 in Figure 1). These behaviors can be aimed at maximizing the benefits of the IS use despite its ambivalent nature (i.e., flexible coping responses), or at preserving them from the discomfort and negative feelings stemming from ambivalence by either avoiding it or evading from it (i.e., inflexible coping responses) [70]. In the next section, we explain these flexible and inflexible coping responses to ambivalence and their associated post-adoptive IS use behaviors. See research model in Figure 2.

## **FIGURE 2 APPEARS HERE**

### **HYPOTHESES DEVELOPMENT**

#### **Inflexible Coping Responses and Plausible Behavioral Outcomes**

Inflexible coping responses to ambivalence comprise response amplifications and indecision [65, 80]. Response amplifications can manifest in *disengagement-oriented coping* and *denial of ambivalence*, while *indecision* denotes reduced ability to decide due to ambivalence. These inflexible coping responses can be associated with different post-adoptive IS use behaviors.

#### ***Negative Response Amplification***

Response amplifications represent a family of inflexible coping responses to ambivalence, where one exaggerates either the positive or the negative aspects of the object of ambivalence as a means to override or dominate the opposite aspects, and thereby relieve the discomfort of ambivalence [5, 6, 31, 64, 65, 77]. Building on the ambivalence-amplification theory by Katz

and Glass [31], a relation between ambivalence and the formation of overly positive or overly negative attitudes toward the object of ambivalence has been validated in different contexts (e.g., [14, 31, 49, 50]). This stream of research suggests that response amplifications can be motivated by the discomfort associated with ambivalence [65], and that they can be conscious or subconscious [3]. A subconscious response amplification is an effort to prevent or evade the discomfort of ambivalence by automatically inflating one aspect of the object of ambivalence over the opposite aspect [3]. More salient experiences of ambivalence can lead to conscious response amplifications, where ambivalent people deliberately decide to commit to one extreme and dismiss the other, if only for the sake of relieving their discomfort of ambivalence. Conscious response amplifications are prone to rationalization because the individuals need a reassuring justification to bolster their choice [3]. In these situations, people can convince themselves that either the positive or negative aspects of the object of ambivalence are superior to the opposite aspects, or can trivialize the positive or negative aspects until the favored one can be enacted with greater ease [79]. Whether conscious or subconscious, response amplifications do not mean that the individual has permanently erased the opposite aspects of the object of ambivalence; rather, these can persist subconsciously [3].

With *negative response amplification*, the user chooses to maintain high focus on negative aspects of the object of ambivalence and low focus on its positive aspects [6]. As a result, negative response amplification manifests itself in conscious or subconscious over-emphasis on the negative aspects of ambivalent IS use, which can lead to (temporary) reduction in the experience of ambivalence. Negative response amplification is conceptually similar to “negative domination” response in Ashforth et al. [3], “moving away” response in Horney [25], “exit” in Hirschman [24], “negative/avoidance” responses in Pratt and Doucet [54], and “introjected

perceived locus of causality” explained in Malhotra et al. [37]. Due to its emphasis on the negative aspects of IS use, negative response amplification can reduce the desirability and attainability of IS use for ambivalent users [23]. In particular, the relative amplification of the negative aspects of IS use (as compared to the positive aspects) can lead to the perception that efforts towards continuing to use IS are an exercise in futility, and tantamount to investing in a bottomless pit [23]. Therefore, disengagement-oriented coping becomes a plausible response for ambivalent IS users in this situation, where users withdraw from dealing with the object of ambivalence (i.e., the post-adoptive IS use) and instead focus on efforts that allow them to cognitively and then behaviorally disengage from it [19, 65, 69]. Given that negative response amplification is a plausible coping response to ambivalence, we propose the following hypothesis:

***H1a:** Ambivalence toward post-adoptive IS use is positively associated with disengagement-oriented coping response.*

For ambivalent IS users, continued use is a function of their successful efforts to resolve their ambivalence towards IS use in a way that allows them to perceive that there are at least some benefits in doing so [70]. Disengagement-oriented coping response to ambivalence toward IS use due to the over-emphasis of its negative aspects can therefore intrinsically motivate discontinuation of IS use. Such discontinuation is consistent with behavioral outcomes discussed in the “moving away” response by Horney [25], “exit” response in Hirschman [24], and “negative/avoidance” responses in Pratt and Doucet [54], all of which demonstrate situations where the negative aspects of an ambivalent situation are amplified. Discontinuation of IS use is less likely in the cases of other coping responses where negative aspects of the ambivalent IS use are not emphasized more strongly than the positive aspects. Indeed, it has been shown that

despite having a positive attitude toward IS use, users can simultaneously develop negative attitudes toward it; but only when these negative attitudes dominate the positive attitudes, as in case of negative response amplification, they can lead to discontinuation of IS use [73]. On this basis, we hypothesize:

***H1b:** Disengagement-oriented coping response to ambivalence is positively associated with discontinuation of IS use.*

### **Positive Response Amplification**

As opposed to negative response amplification, *positive response amplification* manifests itself in users' over-emphasis of the positive aspects of the ambivalence object to evade or reduce the discomfort of ambivalence [65]. Positive response amplification is conceptually similar to "positive domination" responses in Ashforth et al. [3], "moving toward" response in Horney [25], "loyalty" in Hirschman [24], "positive/approach" in Pratt and Doucet [54], and "commitment" in Weigert and Franks [85]. Nonetheless, as Pratt and Pradies [56] note, although this coping response can lead to a favorable assessment of the ambivalence object, it can also result in biased, inflexible, and simplistic views that are "likely, at minimum, to lead to disappointment when undesirable aspects of the new relationship invariably appear" (p. 927). Therefore, similar to negative response amplification, it is considered an *inflexible* coping response to ambivalence [56, 65].

In the case of post-adoptive ambivalent IS use, we contend that although ambivalent users are well aware of the negative aspects of IS use, they may still (consciously or subconsciously) choose to emphasize the positive aspects of it so much that the positive aspects override the negative aspects, at least temporarily. Alternatively, they may trivialize the negative aspects of IS use sufficiently to make them less important than the positive aspects [1, 13]. This coping

response allows users to, at least temporarily, mitigate the discomfort of ambivalence. In the context of post-adoptive IS use, where users have been continuously using the system for some time, positive response amplification is most likely manifested in the denial of the importance or even the existence of ambivalence toward IS use. In other words, an ambivalent post-adoptive IS user who puts stronger emphasis on the positive aspects of IS use, and dismisses its negative aspects, is less likely to acknowledge the importance or existence of ambivalence. Denial of ambivalence is therefore a plausible manifestation of this coping response for post-adoptive IS users. For example, despite the many negative aspects of SNS use (e.g., exposure to misinformation [32], problematic use [74], privacy concerns [15], and cyberbullying [12]), a significant number of users continue to use SNS [74]. This behavior can be explained in light of positive response amplification, where SNS users consciously or subconsciously put more emphasis on the positive aspects of its use, such as being in contact with their friends [17], to trivialize or dismiss its negative aspects [1, 13]. For them, denial of importance or existence of ambivalence toward their SNS use is the most likely manifestation of their coping response. Therefore, given that positive response amplification is a plausible coping effort in response to ambivalence, we hypothesize that:

***H2a: Ambivalence toward post-adoptive IS use is positively associated with denial of ambivalence.***

When positive response amplification is adopted, ambivalence can, at least temporarily, be transformed into highly positive attitudes toward the object of ambivalence, which will in turn facilitate *increased engagement* with the object of ambivalence [24, 31, 65, 77]. In addition, commitment to the object of ambivalence is a behavioral response that can transform

ambivalence in users [8, 11, 85]. To achieve this, ambivalent users may bind together the positive and negative aspects of an object of ambivalence, and choose to commit to it [55, 65].

Against this background, we argue that positive response amplification can transform ambivalence into positive attitudes toward IS use. This transformation manifests itself in the denial of ambivalence, and facilitates increased *duration of IS use* in the context of our paper<sup>2</sup> [81]. We contend that a plausible behavioral outcome of positive response amplification toward IS use, which is manifested in the denial of ambivalence, is the increased duration of IS use. This is a less plausible behavior under other coping responses to ambivalence where the negative aspects of IS use are at least as emphasized as the positive aspects. Therefore, we propose the following hypothesis:

***H2b:*** *Denial of ambivalence toward post-adoptive IS use is positively associated with the increase in the duration of IS use.*

### ***Indecision and Vacillation***

Ambivalence can also lead to conscious or subconscious *indecision* [65, 68, 80]. Indecision is defined as the reduced ability or complete paralysis in deciding between the positive and negative aspects of the ambivalence object [54, 65, 80]. Decisions and tasks are delayed and remain undecided when individuals are uncertain about the consequences of their choices [2, 44, 67]. For example, in two field experiments reported by van Harreveld et al. [80], shoppers in a supermarket were presented with either ambivalent or univalent decisions. The results in both studies indicated that unlike their univalent counterparts, ambivalent shoppers were more likely

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2. IS use has been commonly conceptualized in three different ways — duration, frequency, and intensity of use [81]. Prior research has shown that while duration of use is more strongly influenced by factors internal to the user (e.g., intrinsic motivation), frequency and intensity of use are more strongly predicted by the factors external to the user (e.g., job demands and complexity of tasks) [81]. Therefore, given that our focus is on coping responses to ambivalence, which are internal to the user, we believe that increased duration of IS use is a more conducive conceptualization of increased IS use behavior for our research.

to delay their decisions. Indecision allows the ambivalent users to (temporarily) avoid dealing with ambivalence, and the negative feelings associated with it [80]. This indecision in response to ambivalence is conceptually similar to “avoidance” response (i.e., ambivalence avoidance) in Ashforth et al. [3], “choice delay” and “procrastination” in van Harreveld et al. [80], “paralysis” in Pratt and Doucet [54], and “neglect” in Withey and Cooper [86].

Indecision to avoid addressing an ambivalent situation is not an effective response, as it does not resolve and can eventually exacerbate ambivalence [3, 54, 65]. As a result, it is considered an *inflexible* coping response to ambivalence [65]. Extrapolating to the post-adoptive IS use context, we contend that users may respond to ambivalence and the discomfort it causes by consciously or subconsciously avoiding decisions regarding their ambivalence toward IS use. While, to the best of our knowledge, indecision response to ambivalence has not been the main subject of studies in the IS literature, one recent paper [36] has shown that simultaneous positive and negative evaluations of an intelligent clinical decision support system by some physicians can elevate their degree of indecision regarding the system use. Another study pointed to the potential existence of indecision response among IS users by explaining a group of post-adoptive users who demonstrated high intentions toward both continuance and discontinuance of IS use at the same time, indicating their “difficulty to choose between two conflicting actions” [73, p. 433]. Therefore, we hypothesize:

***H3a: Ambivalence toward post-adoptive IS use is positively associated with indecision.***

Indecision results in a de facto paralysis state where the users cannot decide whether to approach or avoid the object of ambivalence [54, 65, 80]. As a result, indecision is often associated with *vacillation* behavior that occurs primarily ad-hoc, and on the spur of the moment [64, 65, 68]. This vacillation involves arbitrarily wavering between approach and avoidance

behaviors regarding the object of ambivalence [65]. Individuals who (temporarily) put off their ambivalence by avoiding a decision about the positive and negative aspects of the ambivalence object can subsequently end up vacillating between them arbitrarily, as both positive and negative attitudes still exist and each becomes temporally dominant [64, 68]. Extending these findings to the post-adoptive IS use context, we contend that ambivalent users who avoid or delay deciding between the positive and negative aspects of IS use (i.e., indecision coping response) are likely to vacillate between using and avoiding the IS in an ad-hoc manner. The vacillation can facilitate delaying the decision about ambivalent IS use by temporarily appealing to both its positive and negative aspects. On this basis, we hypothesize:

***H3b:** Indecision response to ambivalence is positively associated with vacillation between using and avoiding the IS.*

### **Flexible Coping Responses and Plausible Behavioral Outcomes**

Not all coping responses to ambivalence are inflexible [18, 65]. Indeed, people may follow cognitively flexible approaches toward the object of ambivalence by actively engaging in a multifaceted and balanced consideration of the oppositional aspects of the ambivalence object [61, 64]. Flexible coping responses to ambivalence can be beneficial, as they have been associated with increased creativity and innovative, multifaceted behavioral outcomes [18, 27, 65]. Fong [18] demonstrated that ambivalence can increase attentional breadth and creativity: “[ambivalence] signals that it may be necessary or adaptive to process stimuli in this environment in a flexible, multifaceted way, and to be on the watch for new associations” (p. 1019). Jarvenpaa and Standaert [27] recently discussed “emotional tension” as a mechanism to cultivate and sustain novel ideas, thoughts, and behaviors, because “opposing [ambivalent] emotions create ambiguity and uncertainty that can increase cognitive flexibility and disrupt

prevailing assumptions and beliefs” (p. 984). Similarly, Stein et al. [70] showed that some ambivalent IS users found a “compromise” between the positive and negative aspects of the IS by engaging in improvisational patterns of IS use and “adaptation” of the tasks and the system. We refer to such flexible coping responses to ambivalence as *compromise* responses [3, 70].

Compromise represents a family of coping responses to ambivalence that involves a flexible and balanced focus on both positive and negative aspects of the ambivalence object in order to mutually accommodate them both. Unlike inflexible coping responses, compromise responses to ambivalence occur with neither one of the opposing aspects completely trivialized or amplified, nor is the ambivalent situation left undecided [3, 65]. Rather, some form of a trade-off or a new balance between the opposing aspects of the ambivalence object is actively sought [3, 65].

Compromise responses typically involve conscious and active coping efforts that revolve around the adaptation of the system and users’ behaviors so that they can accommodate both positive and negative aspects [3, 65, 70]. Prior work on ambivalence in the IS discipline and beyond have discussed different compromise responses to cope with ambivalence (e.g., [3, 64, 65, 70, 84]).

On this basis, we hypothesize that:

***H4a: Ambivalence toward post-adoptive IS use is positively associated with compromise response to ambivalence.***

Compromise responses to the post-adoptive ambivalent IS use can be associated with two behaviors—vacillation and innovative adaptation.

### ***Compromise via Vacillation***

Compromise response can lead to *vacillation* behavior that is actively planned, manifesting itself in purposeful, sequential alternations between the opposing aspects of the object of ambivalence. This enables individuals to alternately respect the core of each aspect, while

keeping the focus on both opposing aspects [3]. Compromise via vacillation is conceptually similar to “temporal splitting” in Pratt and Doucet [54] and “black and white compromise” in Ashforth et al. [3], where individuals intentionally and consciously vacillate between behaviors consistent with opposing aspects of the ambivalence object in an active attempt to maintain the balance between them. Compromise via vacillation is different from vacillation due to indecision, where individuals may subconsciously and in an ad-hoc manner waver between opposing aspects of the ambivalence object to avoid the discomfort of ambivalence. While the observed behavior in both cases is vacillation, the underlying mechanisms are markedly different; one is to enact a planned, flexible, conscious effort to alternately maintain the focus on both aspects depending on the situation (i.e., compromise via vacillation), while the other is a passive, arbitrary behavioral reaction often on the spur of moment, to a lack of decision about the object of ambivalence (i.e., vacillation due to indecision). Compromise via vacillation also differs from negative and positive response amplifications, where one aspect of the ambivalence object can be honored long-term due to its over-emphasis [3]. An example of compromise via vacillation in post-adoptive IS use was observed by Stein et al. [70] who described that through vacillation, users address their mixed feelings toward IS use by actively and intentionally “vacillating” between emphasizing its positive and negative aspects. Stein et al. [70] explain this behavior as occasionally focusing on IS opportunities, and alternating to its constraints in a vacillating fashion. On this basis, we hypothesize that:

***H4b:** Compromise response to ambivalence is positively associated with vacillation between using and avoiding the IS.*

### ***Compromise via Innovative Adaptation***

Users can also facilitate a compromise response to ambivalence by adapting innovative behaviors that partially or fully cater to both positive and negative aspects of the ambivalence object at the same time [3, 70]. Compromise via *innovative adaptation* involves conscious and active coping efforts that revolve around changing an implemented IS and/or its pattern of use to formulate innovative solutions that can create a new balance between its oppositional aspects; the ambivalence is thereby reduced or resolved [3]. Compromise via innovative adaptation is in the spirit of *simultaneously embracing both* the positive and negative aspects of IS use, and finding new ways to address them. This can involve adapting, reinventing, or creating new uses of the IS to better accommodate the users' needs to resolve the negative aspects of IS use, maintaining its positive aspects, or a combination of both [70].

Compromise via innovative adaptation is conceptually similar to “personalizing” in Stein et al. [70], “constructive deviance” in Vadera et al. [78], “holism” in Ashforth et al. [3], “transcendence” in Karjalainen et al. [30] and “rational action” and “self-adaptation” in McCrae [39]. These behaviors essentially refer to taking rational and innovative actions to change the ambivalent situation, adapt oneself to the ambivalent circumstances, or a mix of both. As a result, compromise via innovative adaptation is different from compromise via vacillation as it involves an innovative behavior that caters to both aspects of the ambivalent IS use *at the same time*, rather than actively vacillating between them (i.e., catering to one aspect at a time in a vacillating fashion). Compromise via innovative adaptation is also different from positive and negative response amplifications, where only one of the opposing aspects of the ambivalence object is emphasized at the cost of ignoring the other. It is also markedly different from indecision where ambivalence is subconsciously avoided and left unaddressed [65].

We contend that post-adoptive users who are aware of both positive and negative aspects of their IS use can devise innovative adaptation behaviors to address ambivalence. This can happen in form of finding innovative and extended uses of IS, including patterns and types of use not originally intended by the designers [70], as a means to compromise in a way that addresses ambivalence while allowing them to continue to use the IS. On this basis, and given that compromise response can motivate users to innovatively adapt their use to simultaneously address the negative and positive aspects of IS use, we hypothesize:

*H4c: Compromise response to ambivalence is positively associated with innovative adaptation of IS.*

The aforementioned hypotheses address RQ1 by delineating four flexible and inflexible coping responses to ambivalence, and their plausible post-adoptive IS use behaviors (see their summary in Table 1). To address our RQ2, we propose neuroticism as a personality-based contingency factor that can moderate IS users' disposition toward different coping responses.

#### **TABLE 1 APPEARS HERE**

#### **Role of Neuroticism in Coping Responses to Ambivalence**

As explained before, ambivalence can lead to four flexible and inflexible coping responses with different plausible post-adoptive IS use outcomes. This raises the question of what moderates the post-adoptive IS users' disposition toward flexible or inflexible coping responses to ambivalence. This is the essence of RQ2.

One personality trait that can affect the way people respond to unpleasant psychological states such as ambivalence is neuroticism [21, 64, 65]. Neuroticism captures the tendency to exhibit poor psychological adjustments in the face of stressful situations and to experience anxiety, insecurity, and hostility more frequently, more intensely, and more enduring [29]. Users who are

high in neuroticism are more likely to show inflexible and rash responses to contradictory and ambivalent situations; see ordinary situations as threatening; and perceive even minor frustrations as hopelessly difficult [7, 64, 71]. Neurotic users are more likely to get stuck in an inflexible mode of cognitive processing that is preoccupied with avoiding or evading the emotional distress and contradictions rather than to comprehend and adapt to the opposing aspects [63, 64].

Even a small level of ambivalence creates a disharmonious and disorienting experience, accompanied by unpleasant feelings of being torn. It will deplete the cognitive flexibility resources of those high in neuroticism, and tax their executive functioning which would otherwise allow for the modification and adaptation of thoughts and actions [64]. Therefore, when they experience ambivalence, users high in neuroticism will be more focused on avoiding or evading the disorientation and feelings of being torn (i.e., defense mode), rather than discerning the oppositional aspects of the ambivalent IS use to find balanced, compromise responses [64]. By contrast, users with lower levels of neuroticism can manage ambivalence more flexibly, endure its discomfort, and engage in more reflection, creativity, and adaptive responses [64]. We therefore contend that IS users who are high in neuroticism are more likely to engage in inflexible coping responses to ambivalence than users who are low in neuroticism. Similarly, we propose that IS users low in neuroticism are more likely to invest their cognitive resources in processing the oppositional aspects of IS use and their root causes; and they consequently devise more flexible responses to ambivalence. On this basis, we hypothesize:

***H5:** IS users' level of neuroticism increases the likelihood of their (a) disengagement-oriented coping response to ambivalence, (b) denial of ambivalence, (c) indecision, and (d) decreases the likelihood of their compromise response to ambivalence.*

## METHODOLOGY

In a multimethod design, two empirical studies in the context of SNS use were conducted (Figure 3). These two studies investigated the two research questions via two complementary quantitative approaches—variable-centered approach (Study 1) and person-centered approach (Study 2). The variable-centered approach and its pertinent statistical techniques, such as SEM, assesses how the variance in one factor can be explained by other factors in a research model [43, 87]. It is therefore well-suited for statistical testing of hypothesized relations among factors in a research model [83]. This is the objective of Study 1.

### FIGURE 3 APPEARS HERE

Complementing variable-centered insights, the person-centered approach and its techniques, such as LPA, draws upon a system of pertinent factors underlying a phenomenon of interest to identify a typology of users' profiles [42, 47, 87]. Person-centered and variable-centered approaches differ in several ways. Most notably, the variable-centered approach assumes that all users in a sample are drawn from *a single population*, and that a single set of averaged parameters (e.g., path loadings) are estimated for the whole sample. The person-centered approach relaxes this assumption, and considers the possibility that the sample might in fact reflect multiple *subpopulations* characterized by different sets of parameters [42, 46]. The objective of a person-centered study is to identify potential subpopulations presenting different configurations (or profiles) with regard to a system of factors [43]. This is important for our research given that post-adoptive IS users can vary in terms of users' salience of ambivalence, and the nature of their coping responses (i.e., flexible vs. inflexible). While the variable-centered approach in Study 1 is well-suited to test our hypotheses and validate the research model, it is not equipped to identify potential subpopulations of IS users. Therefore, after Study 1, it would still

be unclear how many users in the sample experience salient ambivalence, and what fraction of those ambivalent users respond flexibly or inflexibly to ambivalence.

Additional benefits of the person-centered approach are that (a) users are treated in a more holistic fashion by focusing on a system of factors taken in combination rather than in isolation, and (b) it allows for the detection of complex interactions among factors that would be difficult to detect or interpret with a variable-centered approach. Although not a replacement, the person-centered approach takes a complementary perspective that can uniquely add to our knowledge of ambivalent post-adoptive IS users and the nature of their coping responses. This is the objective of Study 2, which follows recent calls to include complementary person-centered analyses to the variable-centered studies in order to provide a comprehensive perspective on the phenomenon under study [43, 46, 83, 87] (see Appendix C for details).

To this end, Study 1 uses a variable-centered approach and applies SEM to empirically test our proposed hypotheses. Building on the factors validated in Study 1, Study 2 takes a person-centered approach, and uses LPA to identify a typology of SNS users in terms of the salience of ambivalence, their level of neuroticism, their flexible and inflexible coping responses, and the associated post-adoptive SNS use behaviors.

### **Pilot Studies**

Prior to Studies 1 and 2, two pilot studies were conducted to assess the validity and reliability of the measurement instruments. The first pilot study involved a group of 20 SNS users who were asked to provide feedback on the relevance and content validity of the measurement items for the factors in our research model. Based on their inputs, measurement scales were adjusted (see Appendix D for details on measures). The second pilot study was conducted using a separate sample of 50 SNS users who responded to a questionnaire of adjusted measurement items that

resulted from the first pilot study. Descriptive and psychometric analyses demonstrated acceptable validity and reliability for all the measurement scales (see Appendix E).

## **STUDY 1: VARIABLE-CENTERED ANALYSES (ASSESSING THE RESEARCH MODEL)**

### **Procedure and Sample**

Three-wave ( $t_1 - t_3$ ) between-subject online surveys were administered to 331 SNS users who were students at a large North American university, out of which 318 (96%) provided complete responses. This sampling choice was made for three reasons. First, SNS is a multifaceted IS that can trigger ambivalence [17]. Second, SNS use is widespread among university students [72]. Third, university students are likely to hold a mix of positive and negative attitudes toward SNS use that results in ambivalence [73]. The respondents included 52% men and 48% women with average age of 23.7 (SD = 4.94). On average, they had more than five years of SNS use experience (SD = 2.5) and spent an average of three hours per day (SD = 1.56) using SNS. In the surveys, the respondents were asked to only focus on their most frequently-used SNS.

### **Measures and Preliminary Analyses**

Measures were primarily adapted from the established scales. One exception was vacillation, for which we did not find an established instrument in the literature. Therefore, we developed a new scale for this factor following the common scale development procedures (e.g., MacKenzie et al. [35]). Details of measurement items and procedures are outlined in Appendix D. Series of preliminary analyses were conducted to ensure adequate psychometric validity and quality of our data (see details in Appendix E).

### **Hypotheses Testing Results**

We estimated the proposed research model using SEM implemented in AMOS 26, while controlling for age, gender, and habitual use. The research model exhibited acceptable fit to the

data (see Figure 4). The estimated path coefficients and their significance levels supported all hypotheses, except one.

#### **FIGURE 4 APPEARS HERE**

In response to RQ1, the findings lend support to the four hypothesized coping responses to ambivalence and their post-adoptive SNS use behaviors. First, ambivalence is positively associated with disengagement-oriented coping (H1a: 0.31,  $p < 0.001$ ), which is positively associated with trying to discontinue SNS use (H1b: 0.50,  $p < 0.001$ ). Second, ambivalence is positively associated with denial of ambivalence (H2a: 0.21,  $p < 0.001$ ), which is positively associated with duration of SNS use (H2b: 0.21,  $p < 0.001$ ). Third, ambivalence positively affects indecision (H3a: 0.55,  $p < 0.001$ ), which is positively associated with vacillation (H3b: 0.40,  $p < 0.001$ ). Finally, ambivalence is positively associated with compromise response (H4a: 0.28,  $p < 0.001$ ), which in turn positively influences vacillation (H4b: 0.19,  $p = 0.002$ ), as well as trying to innovatively adapt the SNS (H4c: 0.26,  $p < 0.001$ ).

Addressing RQ2, the findings shed light on the moderation effects of neuroticism on users' disposition toward inflexible and flexible coping responses to ambivalence. As expected, our results show that neuroticism positively moderated (strengthened) the relationships between ambivalence and two of the inflexible coping responses to ambivalence, namely disengagement-oriented coping (H5a: 0.11,  $p = 0.043$ ) and indecision (H5c: 0.10,  $p = 0.038$ ), but not denial of ambivalence (H5b: 0.05,  $p = 0.386$ ). The results show that, as expected, neuroticism weakened the relationship between ambivalence and compromise response (H5d: -0.15,  $p = 0.012$ ).

Altogether, the model explained 18% of the variance in disengagement-oriented coping, 26% of the variance in trying to discontinue SNS use, 11% of the variance in denial of ambivalence, 14% of the variance in duration of SNS use, 39% of the variance in indecision, 23% of the

variance in vacillation, 13% of the variance in compromise, and 26% of the variance in trying to innovatively adapt the SNS.

### **Discussion of Study 1 Findings**

As a variable-centered study, Study 1 validated the proposed research model. All the hypotheses, except one, were supported. Responding to RQ1, findings demonstrated the four flexible and inflexible coping responses to ambivalence toward the post-adoptive IS use. Responding to RQ2, the moderation hypotheses demonstrated the importance of neuroticism in shifting users' disposition toward inflexible vs. flexible coping responses. In addition, this study's findings also highlighted the dual nature of vacillation behavior. They showed that while vacillation can be a conscious and active behavior to enact a flexible compromise response to ambivalence (i.e., compromise via vacillation), it can also be a manifestation of an ad-hoc behavioral reaction to indecision in the face of ambivalence (i.e., vacillation due to indecision).

### **STUDY 2: PERSON-CENTERED ANALYSIS (ASSESSING USERS' TYPOLOGY)**

#### **Sample and Measures**

Using similar measures applied in Study 1, we collected two-wave data ( $t_1$  and  $t_2$ ) from a different, between-subject sample of SNS users who were students at a large university in North America for Study 2. We invited 310 SNS users to participate, out of which 299 provided complete responses (96% response rate). Using the same scales as in study 1 (see Appendix D), we measured users' ambivalence, neuroticism, disengagement-oriented coping, denial of ambivalence, indecision, and compromise at  $t_1$ , and users' duration of SNS use, vacillation, trying to discontinue SNS use, and trying to innovatively adapt the SNS at  $t_2$ . Respondents included 50% women with average age of 23.7 (SD= 5.06). They had more than five years of

SNS experience on average, and spent more than two hours per day ( $SD = 1.55$ ) using SNS. Similar to Study 1, participants were asked to focus on their most frequently-used SNS.

### **Descriptive Statistics and Preliminary Analyses**

Results of preliminary analyses (i.e., descriptive statistics and psychometrics assessments) confirmed the validity and reliability of our data and measures in Study 2 (see Appendix E).

### **Three-Step Latent Profile Analysis (LPA) with Distal Outcomes**

To identify distinct profiles (sub-populations) of SNS users based on their ambivalence, neuroticism, and coping responses to ambivalence, we employed a *three-step LPA with distal outcomes* method using Mplus version 7.4 [4]. To do so, Step 1 was to estimate the LPA measurement model, and identify the latent profiles using ambivalence, neuroticism, and the four coping responses to ambivalence, as continuous indicators. Step 2 focused on the best LPA solution determined in Step 1, and estimated the measurement error for this solution which was then used in Step 3 of the estimation. Step 3 focused on estimating the statistical significance of the associations between the latent profiles based on the best LPA solution determined in Step 1, and the predefined “distal outcome variables” using pair-wise chi-square difference tests [4]. In other words, Step 3 involved a series of pair-wise chi-square difference tests to estimate the significance of differences across different profiles in terms of the distal outcome variables. In Study 2, the distal outcome variables were the post-adoptive IS use behaviors associated with coping responses to ambivalence based on our Study 1 findings, namely *trying to discontinue SNS use, duration of SNS use, vacillation, and trying to innovatively adapt the SNS*.

To identify the optimal number of latent profiles, we iteratively conducted three-step LPA with different number of profiles—from one to three (the maximum number of profiles that allowed the LPA to converge). The optimal number of profiles in the data was assessed based on three

criteria: (1) parsimony and interpretability of the latent profiles emerged from LPA [41]; (2) information criteria, where lower values indicate a better fit [9, 40, 51]: Akaike’s Information Criterion (AIC), Bayesian Information Criterion (BIC), sample-size-adjusted BIC, and second-order-bias-corrected AIC; and (3) Parametric Bootstrapped Likelihood Ratio (PBLR) Test. The p-value obtained in PBLR is an approximation of the probability that the data have been generated by a model with one less profile; thus, a low p-value indicates that the model with one less profile is rejected in favor of the estimated model [47]. All three criteria consistently indicated *the three-profile solution* as the optimal fit to our data (see Figure 5 and Appendix F).

**FIGURE 5 APPEARS HERE**

Upon identifying the three latent profiles, pair-wise chi-square tests showed significant differences among the three latent profiles in terms of distal outcomes, namely (1) trying to discontinue SNS use, (2) duration of SNS use, (3) vacillation, and (4) trying to innovatively adapt the SNS (See Figure 6 and Table 2).

**FIGURE 6 APPEARS HERE**

**TABLE 2 APPEARS HERE**

**Discussion of Study 2 Findings: A Typology of SNS Users**

Findings show three prototypical latent profiles of SNS users in terms of ambivalence, neuroticism, and nature of coping responses: (1) “low ambivalence” SNS users (profile 1, n=143), (2) “ambivalent SNS users with inflexible coping responses” (profile 2, n=49), and (3) “ambivalent SNS users with flexible coping responses” (profile 3, n=107).

The first latent profile is the largest of the three subpopulations in our sample (n=143), and represents post-adoptive SNS users with very low levels of ambivalence toward their SNS use (significantly below the sample mean). We label it “low ambivalence” profile. These SNS users

also show very low levels of neuroticism, and low levels of flexible and inflexible coping responses to ambivalence (all factors significantly below the sample mean; see Figure 5). The pair-wise chi-square tests show significantly lower levels of post-adoptive SNS use behaviors for this profile of SNS users (i.e., trying to discontinue SNS use, duration of SNS use, vacillation, and trying to innovatively adapt the SNS) compared to the other two profiles in the sample (see Figure 6 and Table 2).

The second latent profile represents ambivalent post-adoptive SNS users with a stronger emphasis on *inflexible* coping responses to ambivalence (n=49). Users in this profile report significantly higher levels of ambivalence. Their level of neuroticism is the highest in the whole sample (i.e., significantly higher than the other two profiles). We also observe that their inflexible coping responses to ambivalence, namely disengagement-oriented coping, denial of ambivalence, and indecision, are significantly higher than the other two profiles in the sample (see Figure 5). Their compromise response to ambivalence is higher than those of the low ambivalence SNS users, but significantly lower than the third profile (i.e., ambivalent users with flexible response). In terms of post-adoptive SNS use behaviors, the pair-wise chi-square tests show that users in this profile have the highest levels of trying to discontinue SNS use and vacillation, while their level of trying to innovatively adapt the SNS is one of the lowest in the sample (i.e., significantly lower than the third profile, but not statistically different than the low ambivalence profile). Their duration of SNS use is marginally longer than that of the low ambivalence SNS users, but not significantly different from that of the ambivalent SNS users with flexible coping responses (see Figure 6 and Table 2).

The third latent profile comprises post-adoptive ambivalent SNS users with a stronger emphasis on *flexible* coping responses to ambivalence (n=107). This profile reported significantly higher

levels of ambivalence compared to the first profile, while they are not significantly different from the second profile in terms of their ambivalence. Their level of neuroticism is significantly lower than that of the second profile, but significantly higher than the first profile (i.e., “low ambivalence”). We observe a different pattern of coping responses in this profile of post-adoptive SNS users, compared to the second profile (Figure 5). Specifically, the levels of inflexible coping responses, namely disengagement-oriented coping, denial of ambivalence, and indecision, are significantly lower compared to the second profile. Conversely, the level of flexible coping response in this profile, namely compromise, is significantly higher compared to the second profile. Likewise, pair-wise chi-square difference tests show significantly higher levels of trying to innovatively adapt the SNS in this profile as compared to the other two profiles. However, this profile is either significantly lower than or similar to the first and second profiles in terms of trying to discontinue SNS use, duration of SNS use, and vacillation (see Figure 6 and Table 2).

Overall, these findings illustrate a typology of three distinct latent profiles of SNS users in terms of ambivalence, neuroticism, and the nature (i.e., flexible and inflexible) of coping responses. SNS users’ affiliations with these three profiles explain the significant differences in their post-adoptive SNS use behaviors. Therefore, the person-centered findings of Study 2 are consistent with and complement the findings in Study 1.

## **GENERAL DISCUSSION**

### **Theoretical Contributions**

This paper contributes to theory in several ways. First, it shows the prevalence of ambivalence among IS users and its importance for understanding post-adoptive IS use behaviors. This is important because most of the extant IS literature is focused on unidimensional views of IS use.

For example, while the technology adoption model (TAM) and its variants and derivatives (e.g., [82]) are mainly focused on the bright side of IS use and its positive aspects, the research on the dark side of IS use (e.g., [34, 52, 58, 74, 75]) largely focuses on its negative aspects. However, as technology has evolved, more sophisticated meshing of positive and negative implications for users has emerged. Our findings embrace this complexity and show that ambivalence toward IS use is a prevalent experience. In light of these new developments, multifaceted theoretical perspectives that can explain users' *simultaneously mixed* attitudes and emotions toward IS use are insightful for IS research. This is particularly relevant to the research on the post-adoptive stage of IS use, where users are more exposed to its oppositional facets.

Second, this paper shows that given the discomfort and feeling of inconsistency associated with ambivalence, IS users can develop different coping responses that can lead to markedly different patterns of IS use. This emphasizes the importance of a better understanding of IS users' ambivalence, the contingency factors that determine the ways they cope and their responses to it, as well as their behavioral outcomes. This paper contributes to this end by presenting a conceptual framework and an empirical model of ambivalence in IS use, psychological and behavioral outcomes for IS users, and a contingency factor—neuroticism—that influences those outcomes. Given the embryonic stage of IS research on ambivalence, this paper offers a basis for investigating ambivalence in different IS use contexts and stages, and how it shapes various IS use patterns. To this end, the pertinent research streams on coping with ambivalence (see [3, 65] for reviews) can provide a good theoretical and conceptual lens for understanding ambivalence toward IS use, and why and when users choose a certain IS use pattern over others.

Third, our findings portray the dual nature of (i.e., flexible and inflexible) coping responses to ambivalence, and the different patterns of post-adoptive IS use associated with them. In

particular, while inflexible coping responses are susceptible to maladaptive patterns of post-adoptive IS use, flexible coping responses are associated with adaptive patterns. This paper provides clarity on a long-debated controversy surrounding ambivalence, where it was attributed to both favorable and unfavorable outcomes (e.g., see Rothman et al. [65]). We show that behavioral responses to ambivalence depend on the nature of coping responses and the personality of the user (i.e., neuroticism).

Fourth, our findings provide a unique empirical perspective into a less-discussed pattern of IS use, namely *vacillation*, by resolving the tension between its two markedly different conceptualizations in the ambivalence literature. While one stream of research on ambivalence considers vacillation to be a maladaptive behavior associated with inflexible coping efforts in response to ambivalence (e.g., [54, 68]), another stream views vacillation as an enactment of conscious and problem-focused coping efforts to actively manage an ambivalent situation (e.g., [3, 70]). Our findings mend this divide by showing the dual nature of vacillation depending on its underlying coping response to ambivalence. Specifically, we showed that while vacillation can be a maladaptive behavioral outcome associated with indecision, it can also represent the actualization of an effortful and flexible compromise coping response in a conscious attempt to maintain the balance between the oppositional aspects of an IS use.

Fifth, our findings highlight neuroticism as an important personality trait that shifts users' tendencies toward inflexible vs. flexible coping responses to ambivalence. Users with higher levels of neuroticism are more prone to negative feelings of stress and discomfort attributed to ambivalence, which reduces their cognitive flexibility in dealing with ambivalent IS use experiences. Therefore, in ambivalent situations, users' levels of neuroticism can influence their

pattern of IS use. This is a novel perspective on the relationship between user's personality and the post-adoptive IS use behaviors.

Sixth, our person-centered findings (Study 2) further contribute to the IS as well as the ambivalence literature by identifying a typology of three distinct IS user profiles. LPA results showed different patterns of IS use behaviors across the three profiles of users. These findings shed light on *why* some ambivalent IS users use the system heavily and even engage in innovative uses of it despite their ambivalence toward it, while other ambivalent users try to disengage from IS use [70].

Lastly, our person-centered results showed no significant difference in the levels of vacillation and duration of IS use between ambivalent users with flexible and inflexible coping responses. This result points to two important implications. First, it further supports our arguments regarding the dual nature of vacillation behavior, by showing that both profiles of ambivalent IS users with flexible or inflexible coping responses present high levels of vacillation behavior (i.e., significantly larger than sample mean). Second, it suggests that trying to innovatively adapt IS can increase the duration of IS use among ambivalent users who adopt flexible coping response.

### **Practical Implications**

Organizations and service providers typically have a univalent (positive or negative) view of users' orientations toward organizational systems, and often consider mixed attitudes as a sign of resistance or problematic behaviors. Consequently, organizational policies are often univalent and mainly focus on reducing users' resistance by standardizing their patterns of use [26].

Nonetheless, our multimethod findings in this paper point to the importance of adopting a multifaceted view to post-adoptive IS use by considering users' ambivalence, not as a sign of resistance or problematic behaviors, but as a reason for their different patterns of IS use. This

broader perspective can facilitate policies, training, and services tailored for ambivalent users as a means to improve the IS use experience for them.

Our person-centered findings (Study 2) are illuminating in this regard. In particular, our typology shows that a majority of IS users in our sample indeed experience salient ambivalence (i.e.,  $49 + 107 = 156$ ). It is noteworthy that ambivalent orientations toward IS use can be even more prevalent in non-volitional IS use contexts such as organizations where, unlike our volitional SNS use context, specific patterns of use might be “forced” on or “expected” from users [70]. Our person-centered findings point to different types of ambivalent IS users based on their cognitive flexibility in coping with ambivalence. They differed in their dispositions toward patterns of IS use behaviors, ranging from trying to discontinue IS use to trying to innovatively adapt the system. An organizational policy that is not lenient toward and does not promote cognitive flexibility and adaptation of IS use may diminish the IS use or invite unproductive uses of the system [26]. A univalent view may advocate a one-size-fits-all pattern of IS use that works against ambivalent IS users who may need a compromise between the affordances and constraints of the system by innovatively adapting its use.

### **Limitations and Future Research**

Several limitations of this work can be addressed in future research. First, the generalizability of our findings is limited. Future examinations of other types of IS, such as work systems, in other contexts such as non-volitional use, at other adoption stages (e.g., pre- and early-adoption), and with other types of data may offer additional insights. Second, we conceptualized and operationalized ambivalence as the user’s subjective experience of oppositional attitudes toward IS use—also known as “subjective ambivalence” [57] and “felt ambivalence” [48]. This conceptualization of ambivalence is more closely related to coping responses, given the concept

of contradiction embedded in it [80]. However, the ambivalence literature has also discussed objective (or potential) ambivalence [48, 57] manifested in the similarity and intensity of positive and negative evaluations of the object of ambivalence as two separate dimensions (i.e., a bi-dimensional view) [53]. Future studies focused on objective ambivalence toward IS use and its relation to subjective ambivalence and coping responses to it may offer novel insights, thereby extending our findings. Third, we focused on one personality trait, neuroticism, as a contingency factor. Future studies should consider other plausible personality and situational contingency factors that may moderate users' dispositions to different coping responses.

Fourth, while the examination of “triggers” (i.e., sources) of ambivalence toward IS use was beyond the scope of this paper, they present a promising avenue for future research in this area. Recent research on ambivalence have suggested that “multifaceted objects”, “role conflicts”, “contradictory goals”, “dualities”, and “temporal factors” can trigger ambivalence [3]. These need to be examined in the IS use context in future research. Finally, another avenue for future research is the longitudinal examination of coping responses to ambivalence and their associated IS use patterns, which could reveal more about the conditions under which coping responses may change over time, the stages of such changes, and their influence on IS use patterns.

## **CONCLUSIONS**

This paper sought to investigate two research questions regarding users' ambivalence toward post-adoptive IS use, its psychological and behavioral outcomes, and the role of users' personality. To this end, we employed a multimethod design, comprised of two quantitative empirical studies with complementary—variable-centered and person-centered—approaches. The findings revealed that ambivalence toward post-adoptive IS use can drive users to engage in four coping responses in order to avoid, evade, or resolve the tensions associated with

ambivalence. These coping responses were different in nature, with inflexible coping responses mainly focusing on avoiding or evading the discomfort of ambivalence, and flexible coping responses encapsulating multifaceted and balanced perspectives to resolve the root causes of ambivalence. Tracing post-adoptive IS use patterns back to coping responses to ambivalence, and explaining the role of user personality in this process enable researchers to better understand how and why users make different post-adoptive IS use choices.

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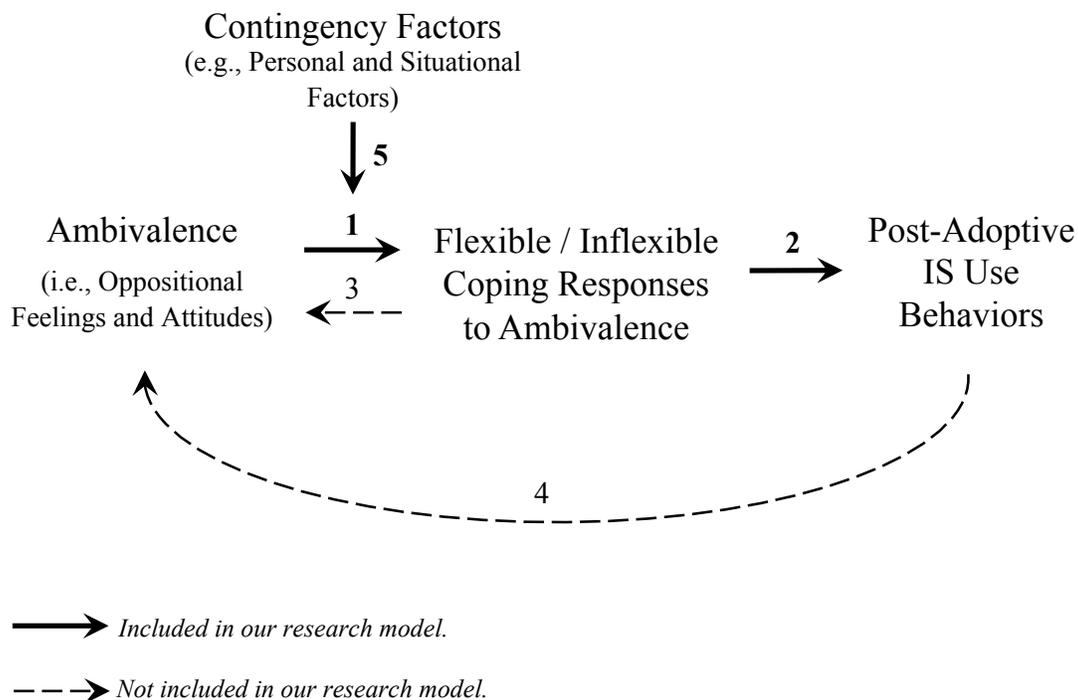
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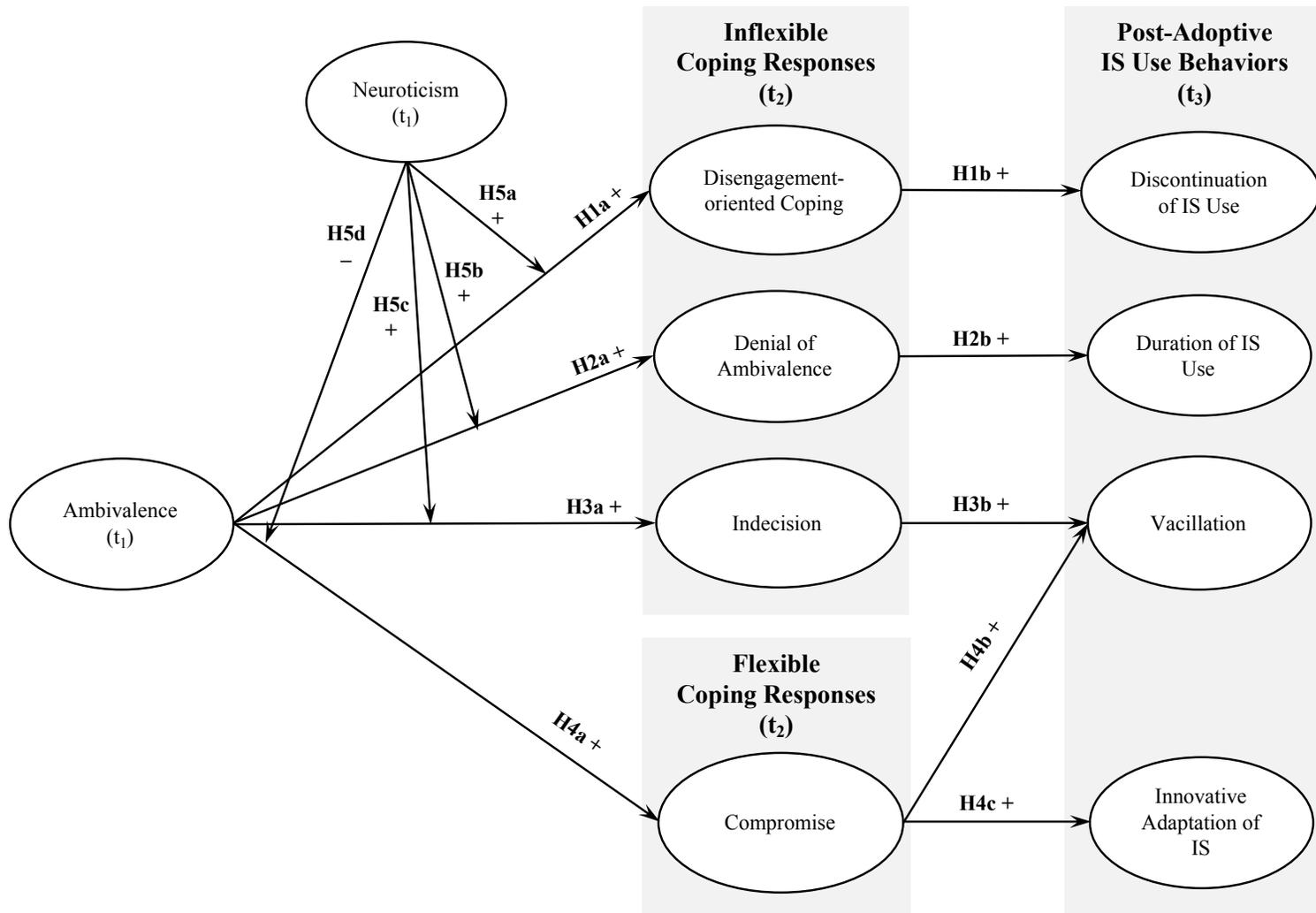
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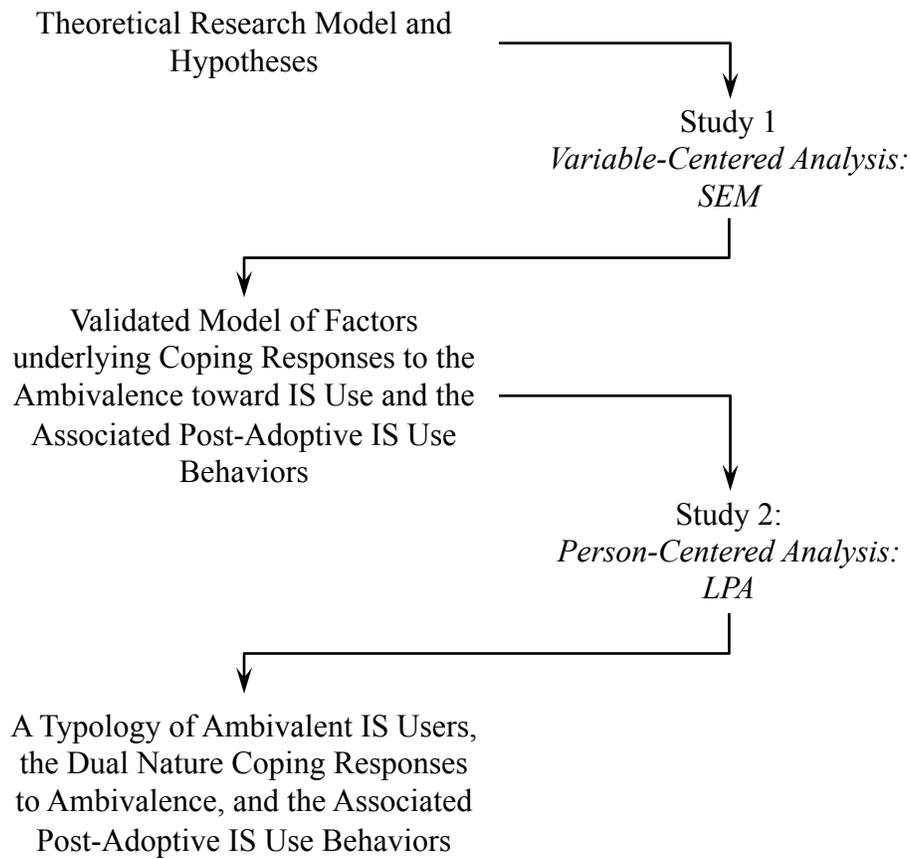
## FIGURES AND TABLES



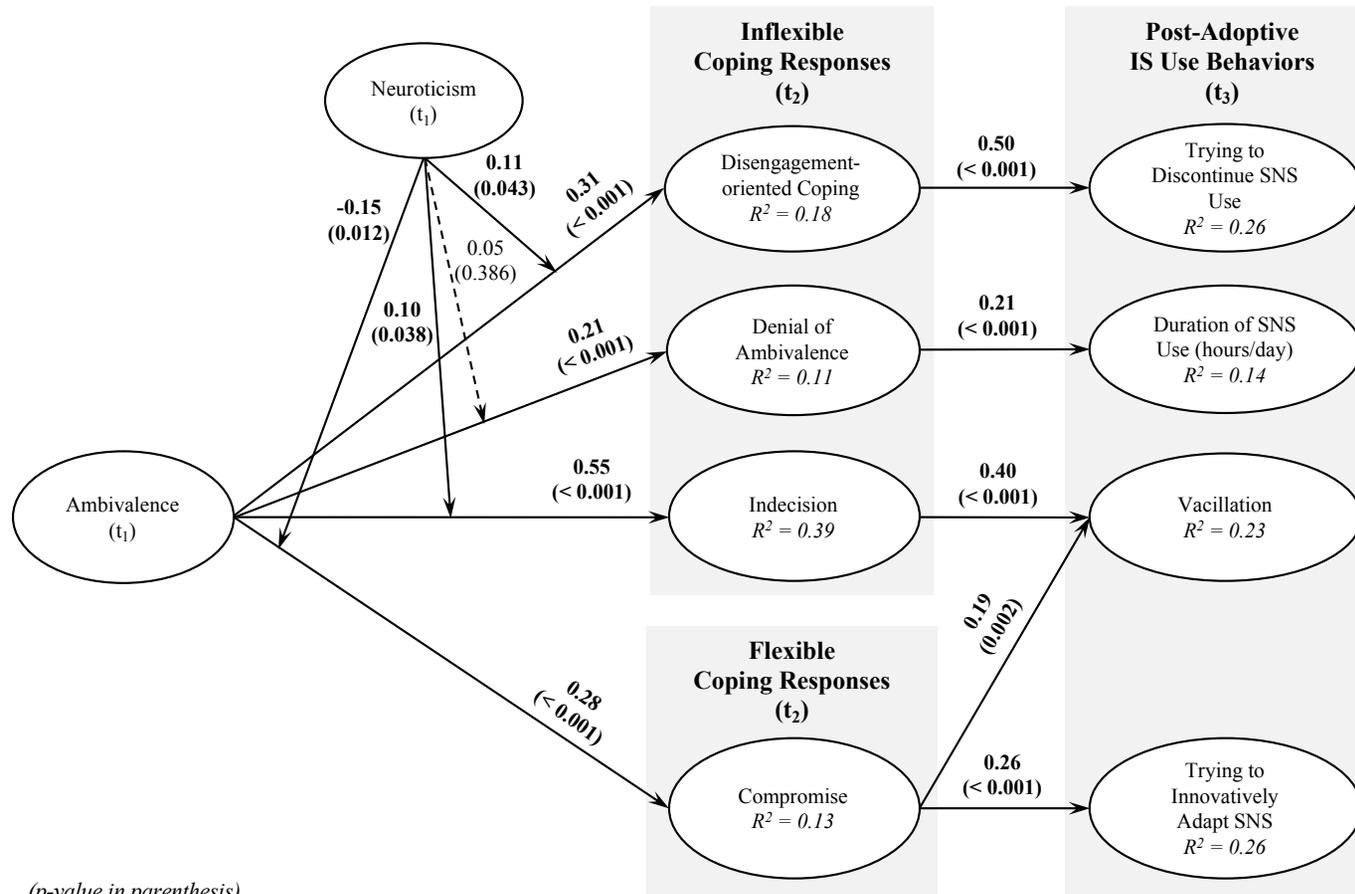
**Figure 1** Conceptual Framework



**Figure 2** Research Model



**Figure 3** The Multimethod Design for this Paper



(p-value in parenthesis)

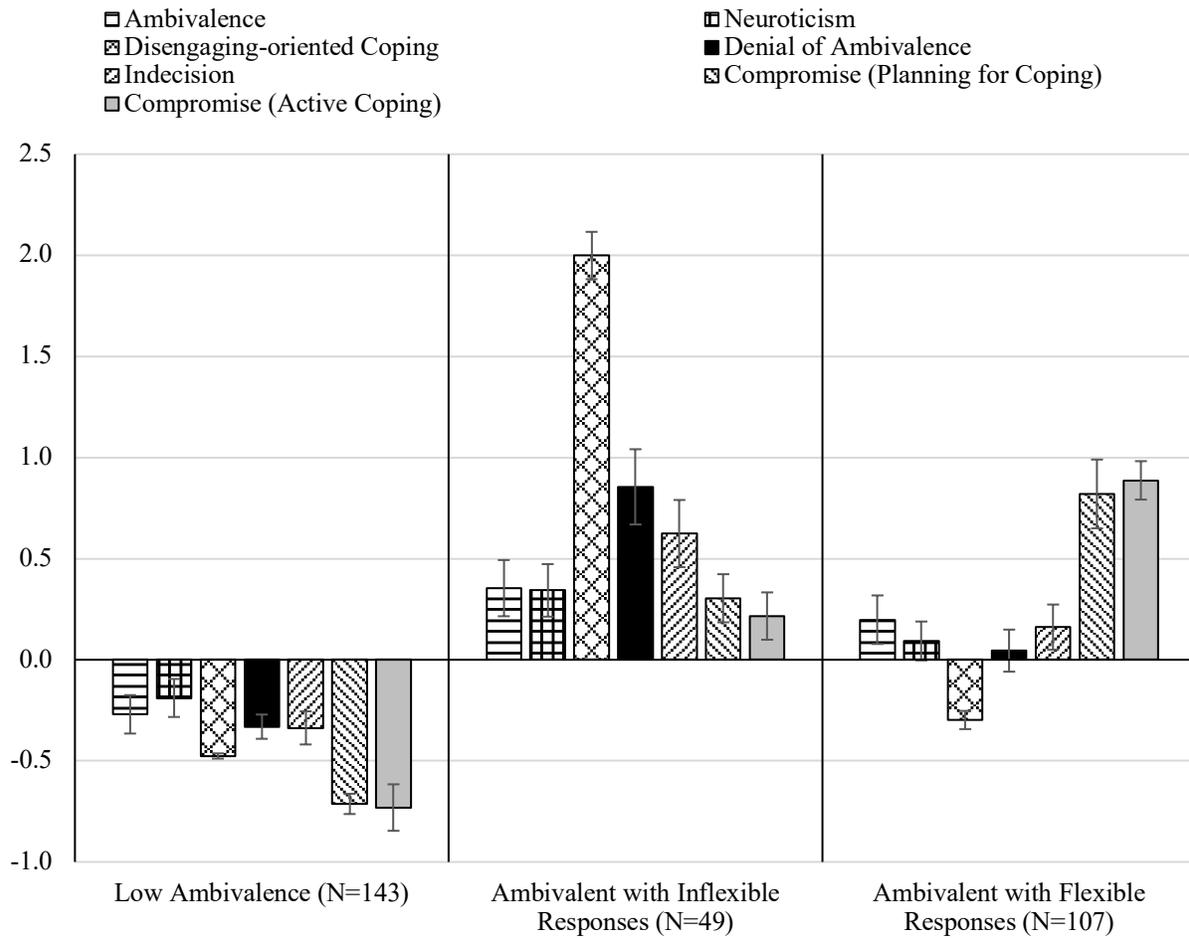
Sample Size = 318; Chi-square (447) = 778.4;

CFI = 0.95; TLI = 0.95; IFI = 0.95; SRMR = 0.08; RMSEA = 0.05 (95% Confidence Interval: 0.04 – 0.05).

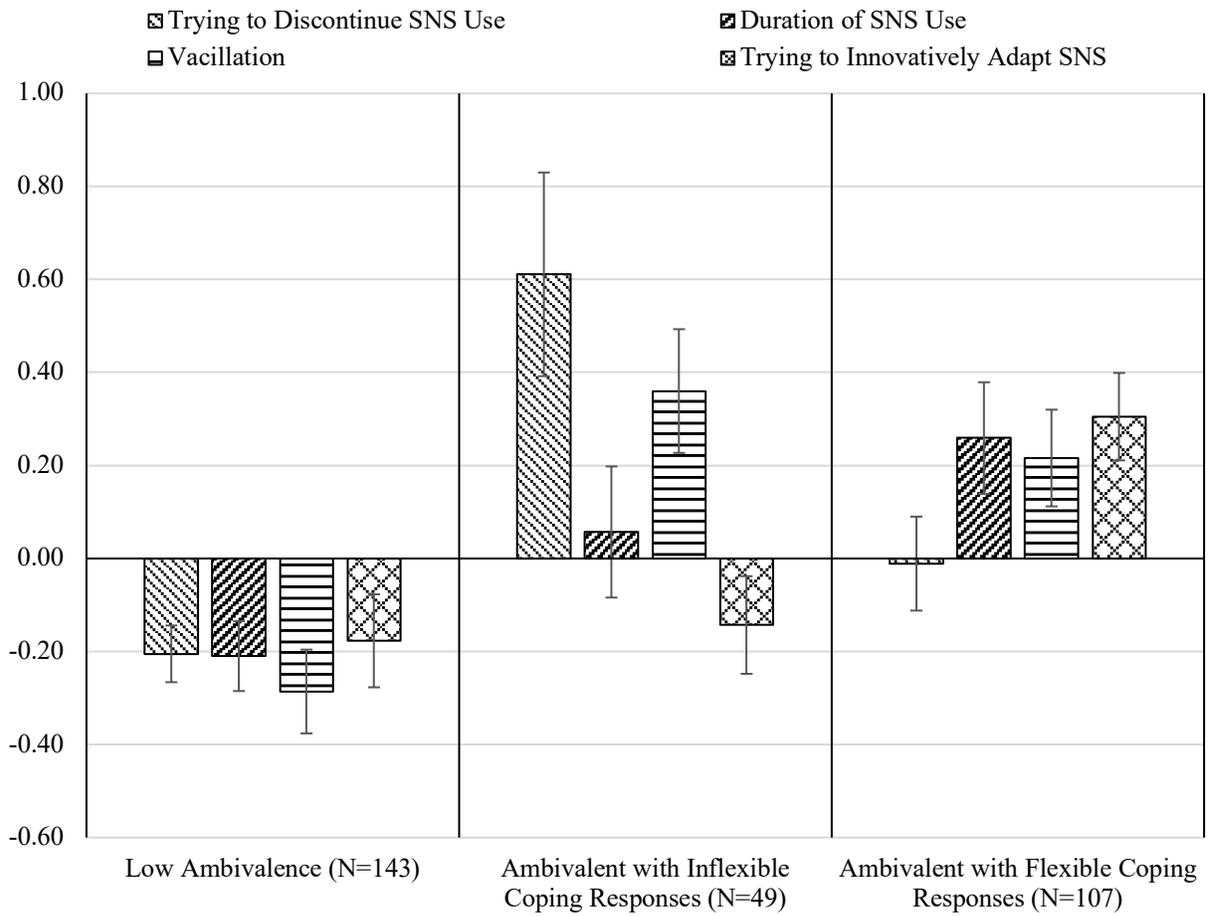
Control Variables: Habitual Use ( $t_3$ ), Gender ( $t_1$ ), Age ( $t_1$ ).

**Figure 4** Results of SEM Analysis of our Research Model<sup>3</sup> (Study 1)

3. We have also tested the research model with correlations among coping responses and correlations among post-adoptive IS use behaviors estimated. The results did not significantly differ from the current results both in terms of goodness of fit of the model and the statistical significance of the relations.



**Figure 5** Results of Three-Step Latent Profile Analysis (Study 2; Standardized Means and Standard Errors: Z-Scores)



**Figure 6** Results of Pair-wise Chi-Square Tests of IS Use Behaviors (Distal Outcomes) across three Latent Profiles (Study 2; Standardized Means and Standard Errors: Z-Scores)

**Table 1** A Summary of Hypothesized Coping Responses to Ambivalence and the Associated Post-Adoptive IS Use Behaviors

<b>Coping Responses</b>	<b>Associated IS Use Behaviors</b>	<b>Remarks</b>	<b>Hypotheses</b>
Disengagement-oriented Coping (inflexible)	Discontinuation of IS Use	Negative response amplification leads to over-emphasis on the negative aspects of ambivalent IS use, which can result in disengagement-oriented coping response to ambivalence. This coping response leaves the negative aspects of the IS use amplified and persistent in users' perceptions, which can lead to discontinuation of IS use.	H1a; H1b
Denial of Ambivalence (inflexible)	Increased Duration of IS Use	Positive response amplification can transform users' ambivalence into a positive attitude toward the IS use. This transformation leads to the denial of ambivalence for post-adoptive IS users. Positive response amplification, manifested in denial of ambivalence, can increase users' engagement with the IS, motivating increased duration of IS use.	H2a; H2b
Indecision (inflexible)	Vacillation	Reduced ability in deciding between the positive and negative aspects of the IS use (i.e., indecision) can allow the ambivalent IS users to (temporarily) avoid or delay dealing with ambivalence and the negative feelings associated with it. Ambivalent users who remain undecided between the positive and negative aspects of the IS use can subsequently end up vacillating between using and avoiding the IS, in an ad-hoc manner, as positive and negative attitudes still exist and each can become temporally dominant.	H3a; H3b
Compromise (flexible)	Vacillation	Compromise response involves flexible coping efforts that revolve around the adaptation of the IS and users' behaviors such that they can accommodate both positive and negative aspects of IS use. Compromise response can lead to vacillation that is actively planned, manifested in purposeful, sequential alternations between using and avoiding IS. This enables individuals to alternately respect the core of each aspect of IS use while keeping the focus on both opposing aspects.	H4a; H4b; H4c
	Innovative Adaptation of IS	Users can also facilitate a compromise response by adapting innovative behaviors that partially or fully cater to both positive and negative aspects of the IS use at the same time. This behavioral outcome involves adapting the IS use to the tasks at hand, adapting the tasks at hand to the IS use, or a combination of both.	

**Table 2** Pair-wise Chi-Square Tests of IS Use Behaviors (Distal Outcomes) across three Latent Profiles (Study 2)

		Trying to Discontinue SNS Use		Duration of SNS Use		Vacillation		Trying to Innovatively Adapt SNS Use	
<i>Profile i</i>	<i>Profile j</i>	<i>Chi-square</i>	<i>P-value</i>	<i>Chi-square</i>	<i>P-value</i>	<i>Chi-square</i>	<i>P-value</i>	<i>Chi-square</i>	<i>P-value</i>
Ambivalent with Inflexible Coping Responses	vs. Low Ambivalence	12.74	0.00	2.83	0.09	16.13	0.00	0.05	0.82
Ambivalent with Inflexible Coping Responses	vs. Ambivalent with Flexible Coping Responses	6.05	0.01	1.16	0.28	0.72	0.40	10.14	0.00
Low Ambivalence	vs. Ambivalent with Flexible Coping Responses	2.68	0.10	9.82	0.00	11.35	0.00	10.56	0.00

# Ambivalence and Coping Responses in Post-Adoptive Information Systems Use

## APPENDIX A: Ambivalence vs. Cognitive Dissonance

While ambivalence and cognitive dissonance both refer to lack of consistency in cognitions and attitudes [6], they are distinct concepts with different psychological and behavioral implications [4, 46]. Specifically, *ambivalence* refers to a psychological state of experiencing *simultaneous* positive and negative attitudes, cognitions, and emotions toward an object. As such, ambivalence occurs when both positive and negative attitudes, cognitions, or emotions about the same object *coexist simultaneously*. Therefore, ambivalence is manifested in experiencing mixed attitudes toward an object, which can create an impetus for inaction, at least in the short term [12, 46]. In contrast, cognitive dissonance occurs “when a person has two beliefs or items of knowledge that are not consistent with each other” [20, p. 417] and both *cannot be true at the same time* [13, 35], such as “I want to hire candidate A and I want to not hire candidate A” [46, p. 37]. As such, cognitive dissonance can create an impetus to resolve a conflict between inconsistent items of knowledge that cannot coexist. Additionally, cognitive dissonance is exclusively cognitive, whereas ambivalence can have cognitive and emotional roots, or even be a result of a clash of oppositional cognitions and emotions [46]. Consistent with these conceptual arguments, prior studies have empirically shown ambivalence and cognitive dissonance as two distinct constructs with different psychological responses [4, 27, 46, 47]. For example, Maio et al. [27] demonstrated low correlation between ambivalence and cognitive dissonance, as well as their distinct effects on information processing among individuals.

## Appendix B: Summary of IS Research Findings pertinent to Ambivalence

We conducted a systematic search of top journals and conferences in information systems (IS) to identify prior IS research on the concept of ambivalence. We specifically searched all current and previous issues of the AIS College of Senior Scholars' Basket of Eight IS journals<sup>1</sup> as well as the proceedings of four top IS conferences, namely ICIS, AMCIS, HICSS, and ECIS, for articles with at least one of the following search terms appearing anywhere in them: “ambivalence”, “ambivalent”, “mixed attitudes”, “mixed feelings”, “mixed emotions”, and “mixed beliefs”. This systematic search initially yielded 430 articles. We removed the conference papers that had later appeared in one of the eight journals that we searched. The remaining articles were more closely examined to assess the extent to which they have actually investigated the concept of ambivalence. As a result, we identified 13 articles that discussed the concept of ambivalence (see Table B1).

**Table B1.** A Summary of Extant IS Research Findings pertinent to Ambivalence

Study	Findings pertinent to Ambivalence
Bala et al. [7]	In this proposed research, authors theorized about the neural correlates of ambivalence toward technology using neuroIS approaches. They proposed that ambivalence elicits multiple different, but simultaneous brain activities and that it elicits more cerebral activity as compared to either pure positive or pure negative orientations toward technology. Finally, they proposed that ambivalence toward technology negatively influence behavioral intention toward the technology.
Briggs et al. [10]	This paper explained the mixed feelings (the simultaneous experience of both positive and negative satisfaction responses) toward an IT from the lens of Yield Shift Theory of satisfaction (YST). It argued that mixed feelings could manifest upon goal attainment under several conditions. First, in a case where an individual ascribes high utility and low likelihood to attaining a goal, and on attaining the goal, obtains substantially less utility than expected. In this situation, individuals may devote their attention resources in one moment to

1. This list includes eight top IS journals, which (in alphabetical order) are European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of Information Technology, Journal of Management Information Systems, Journal of Strategic Information Systems, Journal of the Association for Information Systems, and MIS Quarterly (see <https://aisnet.org/page/SeniorScholarBasket>).

only the likelihood shift, and so experience a positive response, and then in the next moment turn their attention to only the utility shift, producing a negative response, causing a sequence of mixed feelings. This explanation of mixed feeling seems in line with our “indecision” in response to ambivalence and the resulted “vacillation” between IS use behaviors that are consistent with negative and positive satisfaction responses.

Jarvenpaa and Majchrzak [19]	This paper discussed ambivalence in online knowledge collaboration that takes place on discussion boards, open source development, wiki sites, social networking sites, and online knowledge management systems. Online knowledge collaborations can be ambivalent when users collaborate to gain benefits but at the same time protect to avoid harm from perceived vulnerabilities (e.g., bullying and cyber-stalking). It contends that in such ambivalent situations, “vigilant interactions” are critical, referred to “an interactive emergent dialogue in which knowledge is shared while it is protected, requiring deep appraisals of each other’s actions in order to determine how each action may influence the outcomes of the collaboration” (p. 773).
Jarvenpaa and Standaert [18]	This recent paper discussed “emotional tension” as a mechanism to “cultivate and sustain diverse outputs of generativity, in the form of ideas, thoughts, and expressions” (p. 984). This is because “opposing emotions create ambiguity and uncertainty that can increase cognitive flexibility and disrupt prevailing assumptions and beliefs” (p. 984). This paper explained this view in a qualitative study at Formula E, which is “a new motorsports venture that leveraged eSports, social media, crowdsourcing, and driverless cars in digital probes to reveal and examine previously unimagined possibilities of what the world of motorsport could be in the digital era” (p. 982).  Arguments in this paper are similar to our arguments regarding the flexible coping responses to ambivalence (i.e., tension) and their resulted IS use patterns. However, their conceptualization of emotional tension is different from our conceptualization of ambivalence in that they define the emotional tension among different individuals, while ambivalence involves emotional and cognitive tensions that occur within the same person.
Lapointe and Beaudry [22]	It proposed the possibility of ambivalent mindset toward an IT, when users simultaneously experience both acceptance of an IT and resistance to the same IT. For users in ambivalent mindset toward an IT, emotions, cognitions, and attitudes toward the IT and its use would not be totally positive or negative but rather mixed.
Ludwig et al. [24]	This paper explained ambivalence in identification with a user community (i.e., ambivalent identification) that enables the users to “define themselves as the same as the collective at one time but different from it at other moments” (p. 1205). Its analyses of user communities suggested “the negative impact of ambivalent identification on the willingness to interact with other members might be offset by its advantages ... [because] members with ambivalent identifications are fundamentally “outsiders within”, who access the

	<p>knowledge of an insider but hold the critical attitude of the outsider. Thus, their overall participation quantity decreases, but the quality of their argument development remains unaffected, with these members serving as acute, able critics” (p. 1213).</p>
Malhotra et al. [28]	<p>It explained ambivalent psychological situations where there is an apparent conflict and misalignment between external perceived locus of control (i.e., perceived social influences) and internal perceived locus of control (i.e., personal values) toward using an IT. It referred to such an ambivalent situation, “introjected” perceived locus of control (introjected PLOC). It explained that introjected PLOC is often associated with strong self-imposed feelings of coercion that might lead to rejection of the “imposed” behavior. It found that introjected PLOC has negative significant effects on intention to use IT for initial users, while it has no significant effects on intention to use IT for experienced users.</p>
McGrath [30]	<p>Focusing on three success and failure case studies of governmental identity verification systems in Nigeria, UAE, and Bangladesh, this paper described ambivalence between trust and mistrust that can simultaneously coexist as separate dimensions of the same citizen–state relationship. It argued “where distrust is highly likely in one dimension (for example, personal privacy relating to compulsory use of biometric-based identity cards), trust in other dimensions may be high or low, giving rise to ambivalence or suspicion respectively in the relationship overall” (p. 491). Against this theoretical backdrop, it suggested that the repeatedly poor outcomes in the Nigerian case are the result of suspicion, that is, negative sentiment across multiple dimensions of the citizen–state relationship, whereas the more successful outcomes in the Bangladesh and UAE cases result from ambivalence in the relationship. It contended that “for example, an individual may have high trust in her government’s ability to manage fiscal policy and provide for her pension, but distrust it in other ways owing to, say, a poor experience with its error-prone administrative systems. This ambivalence, and the tension it produces, can be productive if it prompts the pension recipient to check her statements to guard against processing errors” (p. 487). As a result, this paper views ambivalence as a relational condition underlying possibly productive behaviors.</p>
Moody et al. [37]	<p>This paper tested the polynomial effects of the components of trust, distrust (i.e., benevolence – malevolence, competence – incompetence, and integrity – deceit), on ambivalence in online transaction relationships. Its findings related to ambivalence were limited to significant effects of incompetence and incompetence<sup>2</sup> (i.e., second-order incompetence component) on ambivalence, while other first- and second-order components of trust and distrust and their interaction terms did not significantly affect ambivalence.</p>
Moody et al. [36]	<p>Focusing on trust and distrust as two distinct factors, this paper argued that trust and distrust coexist in online e-commerce relationships and can result in ambivalence when they both have high attitudinal values, represented in emotions, beliefs, or behaviors. It examined the effect of ambivalence on the</p>

trusting intentions toward the e-commerce website and found a small, but significant positive effect that increases the user's intentions toward the website. However, it did not find any significant moderation effects of ambivalence on the effects of trusting beliefs and distrusting beliefs on trusting intentions.

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Stein et al. [49]	This paper examined the role of emotions in how different IT use patterns emerge, via a qualitative field study. It found five different IT stimulus cues that, when interacting in a reinforcing manner, elicit uniform emotions and, when interacting in an oppositional manner, elicit ambivalent emotions (mixed emotions). It also found that users deal with ambivalent (mixed) emotions by combining different adaptation behaviors, a vacillating strategy between emphasizing positive and negative aspects of the IT stimulus, which can lead to active and positive user engagement, exhibited in task and tool adaptation behaviors and improvisational use patterns that, despite their nonconformity to terms of use, can have positive organizational implications.
Van Offenbeek et al. [53]	This paper unveiled the ambivalent users' behaviors via a two-dimensional framework based on acceptance (non-user – user) and resistance (enthusiastic support – aggressive resistance). This framework led to identifying ambivalent users' behaviors, namely “resisting users” and “supporting non-users”. The framework has been explained in telecare implementation project case study.
Walden et al. [54]	This conference paper investigated whether the positive and negative aspects of users' attitudes toward IT, coexistence of which leads to ambivalence, are separable. They showed that users can experience both positive and negative attitudes toward an IT, and that the positive and negative attitudes are independent.

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## **Appendix C: Person-Centered vs. Variable-Centered Approach**

As a well-established and dominant approach in IS research for decades, the variable-centered approach focuses on the variables (factors) in a model, rather than the individual users. This approach has drawn on pertinent statistical techniques, such as regression and structural equation modeling (SEM), to infer how the variance in outcome variables can be explained by the variances in exogenous variables in a research model [33]. A key characteristic of the variable-centered approach is its focus on capturing the interrelatedness (covariance-based relations) among a set of different variables and using this interrelatedness to infer about the underlying causes (or associations) for a specific phenomenon or behavior [56]. While following a variable-centered approach has been instrumental in understanding IS users' behavior, we contend that the variable-centered approach can be complemented with a "person-centered" approach that can shed a different, user-focused, light on the variance underlying the factors in a research model.

The person-centered approach and its pertinent analysis techniques, such as latent profile analysis (LPA) [5, 39, 57], strive to identify a latent typology of individuals by taking into account their variations along a set of factors [32]. Unlike variable-centered approaches that focus on the relations between specific factors, the person-centered approach acknowledges that factors can combine differently for some types of users than they do for others [32, 33, 38]. Thus, rather than focusing on identifying the factors and how they relate to each other in a population as a whole, the person-centered approach focuses on individual users to identify and compare unobserved subpopulations (i.e., latent classes or prototypical profiles) of users with similar characteristics in terms of the examined factors [32, 57]. Additional benefits of the person-centered approach (over the variable-centered approach) are that (a) users are treated in a more holistic fashion by focusing on a system of factors (often validated in a variable-centered

study) taken in combination rather than in isolation and (b) it allows for the detection of complex interactions among factors that would be difficult to detect or interpret using a variable-centered approach. Consequently, there are recent calls for the inclusion of the person-centered approach in research *as a complementary approach* to the variable-centered approaches [e.g., 15, 32, 33, 38, 56]. While a comprehensive review of studies employing complementary variable-centered and person-centered approaches is beyond the scope of our paper, Table C1 provides some prime examples of such studies within IS and beyond.

A combination of variable-centered and person-centered studies can benefit this research given that post-adoptive IS users can vary in terms of their *salience* of ambivalence and the *nature* of their coping responses to it (i.e., flexible vs. inflexible). While the variable-centered approach in study 1 is well suited for testing our hypotheses and validating our research model, it is not equipped to identify potential subpopulations of IS users. Therefore, after study 1, it would still not be clear what fraction of users in the sample experience salient ambivalence and what fraction of those ambivalent users respond flexibly or inflexibly to ambivalence. To this end, building on study 1 findings, the person-centered analysis in study 2 (three-step LPA; see Appendix F) adds rich and novel insights regarding prototypical IS user profiles in terms of the salience of ambivalence and the nature of (flexible and inflexible) their coping responses. It further shows how these prototypical profiles can explain the differences in users' post-adoptive IS use behaviors.

**Table C1.** A Sample of Studies Employing Complementary Variable-Centered and Person-Centered Approaches

<b>Study</b>	<b>Subject</b>	<b>Variable-centered method</b>	<b>Person-centered method</b>	<b>Findings</b>
Melas et al. [31]	An empirical investigation of Technology Readiness (TR) among medical staff based in Greek hospitals	Covariance-based Structural Equation Modeling	Latent Profile Analysis	First, exploratory covariance-based structural equation modelling analysis is used to confirm the measurement structure of the Technology Readiness Index. Next, the latent profile analysis was employed in order to identify latent profiles of medical staff that have similar values on TR dimensions. They show that the latent profiles can explain variations in computer use, computer knowledge and computer feature demands.
Hoffmann et al. [17]	Digital Natives or Digital Immigrants? The Impact of User Characteristics on Online Trust	Covariance-based Structural Equation Modeling	Latent Class Analysis	Based on a latent class analysis of German Internet users, they identify three latent classes of users in terms of age, web experience, and education: "digital natives", "digital immigrants", and "naturalized digitals". Next, a multiple-group structural equation modeling revealed significant differences in trust formation, particularly in the cues considered in the evaluation of online services, across these three classes of users.
Bouncken and Kraus [8]	Innovation in knowledge-intensive small to medium size enterprises (SMEs)	Covariance-based Structural Equation Modeling	Latent Profile Analysis	First, using covariance-based structural equation modeling they test a theoretical model explaining coopetition, the simultaneous pursuit of cooperation and competition, has a varying impact on innovations of SMEs and that three moderators influence coopetition's innovation performance: (1) sharing knowledge with the partner, (2) learning from the partner (inlearning), and (3) technological uncertainty. Next, using latent profile analysis, they extend the insights of the structural equation analysis by researching the relationships between the constructs as a function of unobserved heterogeneity. The latent profile analysis results identify seven different profiles of SMEs.

**Table C1.** A Sample of Studies Employing Complementary Variable-Centered and Person-Centered Approaches

<b>Study</b>	<b>Subject</b>	<b>Variable-centered method</b>	<b>Person-centered method</b>	<b>Findings</b>
Bouncken and Fredrich [9]	Learning in coopetition: Alliance orientation, network size, and firm types	Covariance-based Structural Equation Modeling	Latent Class Analysis	Using covariance-based structural equation modeling, this study examines how the firm's alliance orientation and its network size influence the leveraging of knowledge (inlearning) gained from a coopetitor. Next, using latent class analysis in an exploratory fashion, they identify two latent (unobserved) classes of firms according to how they achieve inlearning using coopetition.
Wang et al. [55]	Differential Impact of Social Learning on Two Facets of Music Piracy	Partial Least Square	Latent Class Analysis	Using partial least square analysis, they demonstrate that two facets of music piracy – unauthorized obtaining and unauthorized sharing – are differentially influenced by the same social learning environment. Next, using latent class analysis, they identify three latent classes that highlight distinct patterns of social learning influences and show that the differential effects of social learning factors on obtaining and sharing persist across these classes.
Angst et al. [3]	When do IT security investments matter?	Latent Class Growth Mixture Model		Using a growth mixture model approach, they identify two classes of hospitals in terms of adopting of information technology (IT) specific organizational practices: symbolic and substantive adoption. They show that this two-class solution moderates the effect that IT security investments have on reducing the incidence of data security breaches over time.
Zyphur [57]	Switching Analytical Mindsets	Multiple Linear Regression	Latent Profile Analysis	"The regression mindset is associated with a focus on relationships among variables, where each variable and its relationship with a criterion is separately considered. Conversely, LPA is associated with a focus on relationships among people, where all variables are considered jointly as they define a distinct profile explaining the standings of multiple individuals" (p. 683).

**Table C1.** A Sample of Studies Employing Complementary Variable-Centered and Person-Centered Approaches

<b>Study</b>	<b>Subject</b>	<b>Variable-centered method</b>	<b>Person-centered method</b>	<b>Findings</b>
Marsh et al. [29]	Academic Self-Concept Dimensions	Correlational Analysis	Latent Profile Analysis	Correlational analyses showed importance of eight academic self-concept dimensions for Academic achievements (i.e., grades). LPA complemented these analyses by identifying five different profiles of students based on the eight academic self-concept dimensions and their difference in terms of their academic achievements.
Hill et al. [16]	Adolescent Binge Drinking	Logistics Regression	Semiparametric group-based modeling (SGM)	There are four groups of adolescents identified by person-centered analysis – SGM – based on their binge drinking patterns: Non-Bingers, Early Highs, Increasers, and Late Onsetters. Then, logistics regression showed how these four binge drinking patterns in adolescence predict crime, alcohol abuse/dependence, drug abuse/dependence, high school completion, involvement in clubs and activities, and parental bonding at age 21.

## APPENDIX D: Measures

Table D1 provides the measurement scales for the factors. Specifically, *ambivalence* was measured by adapting the items for felt (“subjective”) ambivalence [40, 44, 45] to the context of SNS use. These items capture the self-report extent of ambivalence and mixed feelings toward SNS use experienced by a user. *Neuroticism* was measured with a 3-item scale adopted from Srivastava et al. [48]. Control and descriptive variables included *habitual use of SNS* [52] as well as demographics such as *age*, *gender*, and the *most frequently used SNS*.

For measuring coping responses, *disengagement-oriented coping* and *denial of ambivalence* were respectively adapted from the items for behavioral disengagement and denial in the Brief COPE measurement inventory [11]. Moreover, two scales from the Brief COPE measurement inventory, namely “active coping” and “planning” scales, were conceptually relevant to our compromise coping response [11]. As a result, we operationalized *compromise* as a second-order reflective<sup>2</sup> factor based on active coping and planning scales adapted from the Brief COPE measurement inventory [11]. Furthermore, *indecision* was measured by adapting Priester and Petty [44]’s indecision scale to the SNS use context.

For measuring post-adoptive IS use behaviors, *duration of IS use* was measured in terms of the number of hours per day spent on SNS. Because we could not identify an appropriate measurement scale in the extant literature for measuring *Vacillation*, we developed a scale for it. To do so, we followed common scale development procedures (e.g., MacKenzie et al. [25]). Specifically, we (1) conceptualized and defined vacillation behavior in the content of post-adoptive SNS use, (2) generated measurement items to represent the vacillation behavior based

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2. Given their conceptual similarity, active coping and planning scales in Brief COPE measurement inventory [11] were used in a second-order *reflective* factor. Their conceptual similarity is also reflected in their strong correlation (0.66,  $p < 0.001$ ) justifies the choice of reflective specification for our second-order factor.

on its definition, (3) assessed the content validity of the generated items in pilot study 1 using a sample of 20 SNS users and adjusted the items accordingly (see Appendix E), (4) specified a measurement model for the whole model including vacillation as a first-order reflective construct, (5) collected data for pilot study 2 for pre-testing the scales where we tested the psychometric characteristics of all scales including vacillation (i.e., internal reliability, convergent and discriminant validity; see Appendix E), (6) ensured the goodness of fit of the measurement model using confirmatory factor analysis (CFA) using study 1 sample and re-examined the psychometric characteristics of all scales, including vacillation scale, using our study 1 and study 2 samples (see Appendix E).

Furthermore, to operationalize “discontinuation of IS use” and “innovative adaptation of IS use”, we drew on the theory of trying [1] and respectively measured users’ extent of trying to discontinue the SNS use and trying to innovatively adapt the SNS use. The theoretical reason is that while rational behaviors are preceded by a deliberate process that culminates in the intention to act, perceived impediments can prevent users from actualizing the behaviors [1, 2]. This argument is relevant to ambivalent IS users who intend to either discontinue the ambivalent IS use or engage in innovative adaptation of IS because both the discontinued use and innovative adaptations are prone to perceived impediments that can affect their actualizations. Specifically, for a post-adoptive user who has been using an IS for a while, discontinuing the IS use may not be a straightforward and easy-to-actualize behavior. As a case in point, discontinuing SNS use after an extended period of usage might not be easy to implement given the friends network the user has developed on the SNS and the possibility of habituated use patterns that can be difficult to break [52]. Similarly, innovative adaptation of IS is inherently prone to unanticipated barriers and impediments, which can thwart its actualization despite users’ intention [1].

Therefore, drawing on the theory of trying and consistent with prior IS research [1, 51], we argue that in such a situation, *trying* to perform a behavior is a better predictor of user behaviors that is less biased by external factors [1]. Trying is a necessary condition of actualizing a behavior that mediates the relationship between intention and behavior, defined as “doing all the necessary pre-behaviors and otherwise satisfying all necessary conditions that are within volitional control for the performance of the subjective behavior” [1, p. 435]. As such, we operationalized innovative adaptation of IS use and discontinuation of IS use in the SNS use context with the following corresponding factors: “trying to innovatively adapt SNS use” and “trying to discontinue SNS use”. *Trying to innovatively adapt SNS use* was measured with items from Ahuja and Thatcher [1]’s scale for trying to innovate with IT, which were adapted to the context of SNS use. Similarly, *trying to discontinue SNS use* was measured using a self-developed scale that was largely informed by Ahuja and Thatcher [1]’s scale for trying to innovate with IT.

**Table D1.** Measurement Instruments in Studies 1 and 2

Factors	Time of Measurement		Measures
	Study 1	Study 2	
Ambivalence [40, 44, 45]	t <sub>1</sub>	t <sub>1</sub>	Based on your experience with using this SNS, please indicate the extent to which you agree with the following statements ( <i>1: Strongly Disagree; 7: Strongly Agree</i> ) <ul style="list-style-type: none"> <li>• I have mixed emotions both for and against using this social networking site, all at the same time.</li> <li>• I have mixed opinions both for and against using this social networking site, all at the same time.</li> <li>• I find myself feeling torn between the two sides of the issue of using and not using this social networking site.</li> <li>• My feelings regarding this social networking site use do NOT go in one direction.</li> <li>• I have opposite (positive and negative) feelings about using this social networking site.</li> </ul>
Neuroticism [48]	t <sub>1</sub>	t <sub>1</sub>	I see myself as ... ( <i>1: Strongly Disagree; 7: Strongly Agree</i> ) <ul style="list-style-type: none"> <li>• ... moody.</li> <li>• ... easily upset.</li> <li>• ... anxious.</li> </ul>

**Table D1.** Measurement Instruments in Studies 1 and 2

Factors	Time of Measurement		Measures
	Study 1	Study 2	
Disengagement-oriented Coping [11]	t <sub>2</sub>	t <sub>1</sub>	<p>Please indicate to what extent you've been doing what the item says to cope with the mixed emotions, mixed opinions, and opposite feelings you might have as a result of using this SNS. Please do NOT answer on the basis of whether it seems to be working or not — just whether or not you have been doing it (<i>1: I haven't been doing this at all; 4: I have been doing this a lot</i>).</p> <ul style="list-style-type: none"> <li>I've been giving up trying to deal with it.</li> <li>I've been giving up the attempt to cope.</li> </ul>
Denial of Ambivalence [11]	t <sub>2</sub>	t <sub>1</sub>	<ul style="list-style-type: none"> <li>I have been denying any mixed feelings and opinions I have been experiencing as a result of using this SNS.</li> <li>I have been refusing to believe that I am feeling torn between opposite emotions or opinions due to using this SNS.</li> </ul>
Active Coping [11]	t <sub>2</sub>	t <sub>1</sub>	<ul style="list-style-type: none"> <li>I've been concentrating my efforts on doing something to resolve my mixed feelings and opinions about using this SNS.</li> <li>I've been focusing on taking actions to try to make this situation better.</li> </ul>
Planning to Cope [11]	t <sub>2</sub>	t <sub>1</sub>	<ul style="list-style-type: none"> <li>I've been trying to come up with a strategy about what to do about this situation.</li> <li>I've been thinking hard about what steps to take to resolve this situation.</li> </ul>
Indecision [44]	t <sub>2</sub>	t <sub>1</sub>	<p>Based on your experience with using this SNS, please indicate your overall reaction toward continue using this SNS</p> <ul style="list-style-type: none"> <li>0 (I feel no uncertainty at all) to 10 (I feel maximum uncertainty).</li> <li>0 (I feel no indecision at all) to 10 (I feel maximum indecision).</li> </ul>
Duration of SNS Use	t <sub>3</sub>	t <sub>2</sub>	<ul style="list-style-type: none"> <li>On average, how many hours per day do you spend on using this SNS? (<i>1: Less than 1 hour per day; 7: About 6 hours or more per day</i>)</li> </ul>
Vacillation (self-developed)	t <sub>3</sub>	t <sub>2</sub>	<p>Based on your recent experience with this SNS, please indicate the extent to which you agree with the following statements (<i>1: Strongly Disagree; 7: Strongly Agree</i>):</p> <ul style="list-style-type: none"> <li>I have switched back and forth between using and not using this SNS.</li> <li>My behavior regarding my extent of using this SNS has been swaying between more and less use.</li> <li>I have kept on swinging between using and not using this SNS.</li> </ul>

**Table D1.** Measurement Instruments in Studies 1 and 2

Factors	Time of Measurement		Measures
	Study 1	Study 2	
			<ul style="list-style-type: none"> <li>I have fluctuated between a heavy use and a light use of this SNS.</li> </ul>
Trying to Discontinue SNS Use [1]	t <sub>3</sub>	t <sub>2</sub>	<p>Based on your recent experience with this SNS, please indicate the extent to which you agree with the following statements (<i>1: Strongly Disagree; 7: Strongly Agree</i>):</p> <ul style="list-style-type: none"> <li>I try to find new uses of this social networking site.</li> <li>I try to use this social networking site in novel ways.</li> </ul>
Trying to Innovate with SNS [1]	t <sub>3</sub>	t <sub>2</sub>	<p>Based on your recent experience with this SNS, please indicate the extent to which you agree with the following statements (<i>1: Strongly Disagree; 7: Strongly Agree</i>):</p> <ul style="list-style-type: none"> <li>I try to find new uses of this social networking site.</li> <li>I try to use this social networking site in novel ways.</li> </ul>
Habitual Use of SNS [52]	t <sub>1</sub>	t <sub>1</sub>	<p>Please indicate the extent to which you agree with the following statements (<i>1: Strongly Disagree; 7: Strongly Agree</i>):</p> <ul style="list-style-type: none"> <li>Using this SNS has become automatic to me.</li> <li>Using this SNS is natural to me.</li> <li>When I want to interact with friends and relatives, using this SNS is an obvious choice for me</li> </ul>

## **APPENDIX E: Pilot Studies and Preliminary Analyses**

Prior to conducting studies 1 and 2, we conducted two pilot studies to ensure the validity and reliability of our measures.

### **E.1. Pilot Study 1**

In pilot study 1, a group of 20 SNS users (three faculty members and 17 students) was invited for a thirty-minute meeting, in which they were asked to provide feedback on the relevance, adequacy, and content validity of the pool of measurement items that were adapted from, or developed based on the pertinent literature. These participants were not part of consequent data collections in any of the two studies. Items and construct definitions were shared with them in advance, and the session was run as a moderated discussion, reviewing one scale at a time.

Participants were specifically asked to assess the correspondence between the candidate items and the construct they are intended to measure and to comment on the relevance, adequacy, and content validity of the proposed items. Based on their inputs, minor adjustments were applied, resulted in the scales outlined in Appendix D.

### **E.2. Pilot Study 2**

Next, pilot study 2 was conducted using another sample of 50 SNS users. These participants, too, were not a part of main data collections in any of the two studies. The purpose of pilot study 2 was to ensure the reliability and validity of the measurement items that emerged from the face-validity session in pilot study 1. Participants were asked to complete an online survey based on the measurement items presented in Appendix D. Then, descriptive statistics, reliability scores, cross loadings, and inter-construct correlations for the constructs were calculated using this sample. As outlined in Table E1, the results demonstrated that all constructs were internally consistent with Cronbach's  $\alpha$  and Fornell and Larcker [14]'s composite reliability scores above

0.7 [41]. Moreover, the results also demonstrated strong convergent and discriminant validity with (1) square root of AVE scores over 0.7 and exceeding the corresponding correlations with other constructs [50]; and (2) all items having larger loadings on their corresponding constructs compared to their cross-loadings with the other constructs [50] (See Table E2). Furthermore, the results indicated that data distributions were reasonably normal [21, 34]. Moreover, variance inflation factor (VIF) indices of less than 1.56 indicated that multicollinearity was not an issue in these data [34]. Overall, it was concluded that the measurement instruments were sufficiently valid and reliable and that they can consequently be used in the main studies.

**Table E1.** Descriptive Statistics, Reliabilities, Square Root of AVEs (bold, Italic diagonal), and Correlations for Pilot Study 2

	Mean (SD)	Skew (Kur.)	CR (Cr.)	1	2	3	4	5	6	7	8	9	10	11	12	13
(1) Ambivalence (t <sub>1</sub> )	3.02 (1.65)	0.42 (-0.90)	0.97 (0.96)	<b>0.92</b>												
(2) Neuroticism (t <sub>1</sub> )	3.03 (1.45)	0.41 (-0.34)	0.91 (0.85)	0.41	<b>0.88</b>											
(3) Disengagement-oriented Coping (t <sub>1</sub> )	1.33 (0.60)	1.72 (1.82)	0.97 (0.93)	0.24	0.19	<b>0.97</b>										
(4) Denial of Ambivalence (t <sub>1</sub> )	1.57 (0.92)	1.54 (1.22)	0.94 (0.86)	0.25	0.23	0.36	<b>0.94</b>									
(5) Indecision (t <sub>1</sub> )	3.31 (2.54)	1.32 (0.89)	0.92 (0.82)	0.54	0.24	0.25	0.17	<b>0.92</b>								
(6) Active Coping* (t <sub>1</sub> )	1.85 (1.04)	0.83 (-0.71)	0.99 (0.98)	0.38	0.24	0.14	0.19	0.22	<b>0.99</b>							
(7) Planning* (t <sub>1</sub> )	1.88 (1.02)	0.82 (-0.62)	0.99 (0.97)	0.42	0.21	0.31	0.14	0.13	0.79*	<b>0.98</b>						
(8) Trying to Discontinue (t <sub>1</sub> )	1.45 (0.80)	2.53 (4.22)	0.86 (0.82)	0.49	0.14	0.29	0.19	0.50	0.27	0.20	<b>0.87</b>					
(9) Duration of SNS Use (t <sub>1</sub> )	2.86 (1.48)	0.8 (0.67)	NA	0.42	0.30	0.29	0.22	0.16	0.32	0.52	0.18	<b>1.00</b>				
(10) Vacillation (t <sub>1</sub> )	2.64 (1.29)	0.87 (0.87)	0.93 (0.91)	0.40	0.41	0.23	0.16	0.25	0.27	0.45	0.34	0.45	<b>0.88</b>			
(11) Trying to Innovate (t <sub>1</sub> )	4.15 (1.79)	-0.18 (-0.80)	0.95 (0.90)	0.37	0.32	0.07	0.27	0.15	0.28	0.34	0.04	0.53	0.27	<b>0.95</b>		
(12) Habitual Use (t <sub>1</sub> )	4.72 (1.70)	-0.6 (-0.41)	0.97 (0.95)	0.23	0.41	-0.09	0.18	0.10	0.01	0.00	-0.04	0.34	0.18	0.57	<b>0.95</b>	
(13) Age (t <sub>1</sub> )	24.12 (4.53)	1.41 (1.28)	NA	0.26	0.22	-0.01	-0.05	0.06	-0.09	-0.05	0.23	-0.06	0.05	-0.09	-0.03	<b>1.00</b>
(14) Gender (t <sub>1</sub> )	1.58 (0.50)	-0.33 (-1.97)	NA	0.20	-0.03	0.10	0.20	0.28	0.03	0.00	0.13	-0.03	-0.06	-0.09	-0.30	-0.03

*Pilot Sample Size = 50; SD: Standard Deviation; Skew: Skewness; Kur.: Kurtosis; CR: Composite Reliability; Cr. Cronbach Alpha; NA: Not Applicable; \* First order factors underlying the second-order reflective specification of compromise factor. Therefore, their high correlation is reasonable and expected.*

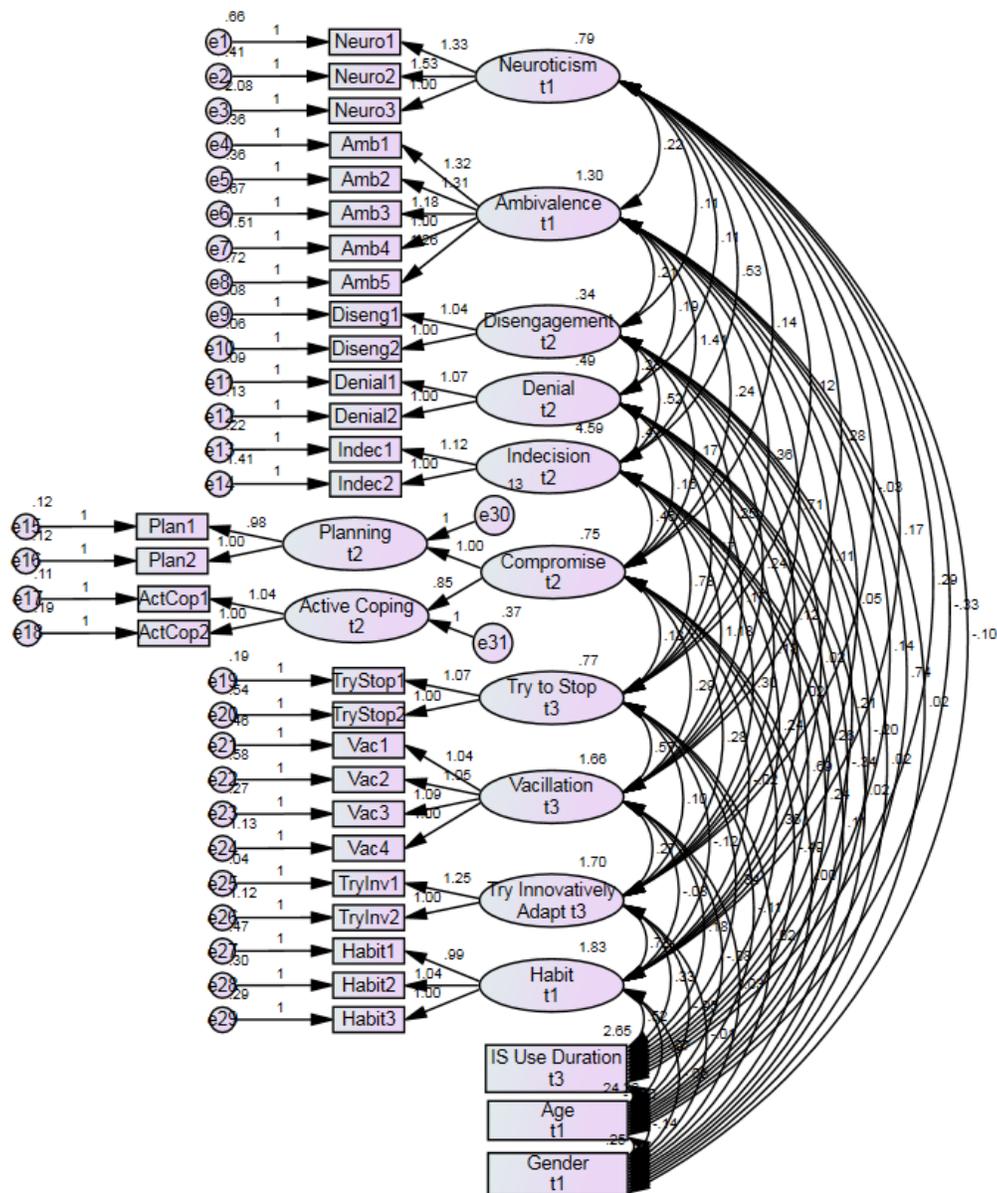
**Table E2.** Cross Loadings of Measures and Factors for Pilot Study 2 (n = 50)

	Ambiv	Neuro	Diseng	Denial	Indec.	Active Coping	Plan	Try Discont	Duration of Use	Vacillate	Try Innovate	Habitual Use
Ambiv1	<b>0.94</b>	0.31	0.31	0.19	0.57	0.33	0.43	0.48	0.37	0.40	0.33	0.15
Ambiv2	<b>0.95</b>	0.35	0.21	0.17	0.51	0.38	0.41	0.49	0.36	0.41	0.38	0.17
Ambiv3	<b>0.91</b>	0.44	0.27	0.24	0.55	0.38	0.41	0.42	0.44	0.41	0.37	0.24
Ambiv4	<b>0.88</b>	0.38	0.17	0.23	0.47	0.28	0.33	0.43	0.35	0.28	0.32	0.26
Ambiv5	<b>0.93</b>	0.46	0.17	0.32	0.54	0.39	0.38	0.46	0.44	0.42	0.32	0.21
Neuro1	0.29	<b>0.89</b>	0.14	0.18	0.20	0.15	0.17	0.06	0.26	0.40	0.26	0.27
Neuro2	0.44	<b>0.94</b>	0.21	0.29	0.36	0.19	0.20	0.14	0.28	0.36	0.33	0.37
Neuro3	0.36	<b>0.81</b>	0.15	0.15	0.14	0.28	0.19	0.15	0.26	0.35	0.27	0.40
Diseng1	0.27	0.22	<b>0.97</b>	0.38	0.35	0.18	0.34	0.28	0.32	0.21	0.11	-0.03
Diseng2	0.20	0.15	<b>0.96</b>	0.32	0.40	0.09	0.26	0.28	0.25	0.24	0.03	-0.14
Denial1	0.22	0.25	0.33	<b>0.94</b>	0.27	0.12	0.11	0.17	0.20	0.13	0.27	0.20
Denial2	0.25	0.21	0.36	<b>0.94</b>	0.21	0.24	0.15	0.18	0.21	0.19	0.24	0.13
Indec1	0.58	0.30	0.34	0.20	<b>0.94</b>	0.29	0.30	0.50	0.27	0.27	0.03	-0.14
Indec2	0.46	0.20	0.38	0.29	<b>0.89</b>	0.31	0.29	0.26	0.30	0.16	0.29	-0.09
Active1	0.37	0.22	0.10	0.13	0.29	<b>0.99</b>	0.75	0.27	0.27	0.26	0.25	0.01
Active2	0.39	0.24	0.18	0.24	0.35	<b>0.99</b>	0.71	0.26	0.35	0.27	0.33	0.02
Plan1	0.44	0.22	0.31	0.17	0.34	0.78	<b>0.99</b>	0.20	0.53	0.49	0.33	-0.01
Plan2	0.40	0.20	0.30	0.11	0.29	0.77	<b>0.99</b>	0.20	0.49	0.40	0.34	0.02
TryDis1	0.49	0.16	0.30	0.19	0.49	0.22	0.10	<b>0.96</b>	0.10	0.33	0.00	-0.02
TryDis2	0.33	0.05	0.18	0.13	0.15	0.30	0.37	<b>0.77</b>	0.30	0.34	0.14	-0.06
Use Int.	0.43	0.30	0.30	0.22	0.31	0.32	0.52	0.18	<b>1.00</b>	0.46	0.53	0.35
Vacil1	0.41	0.30	0.29	-0.01	0.25	0.15	0.38	0.37	0.36	<b>0.82</b>	0.23	0.10
Vacil2	0.34	0.40	0.25	0.19	0.19	0.20	0.42	0.22	0.43	<b>0.93</b>	0.28	0.17
Vacil3	0.49	0.48	0.24	0.26	0.34	0.28	0.42	0.52	0.45	<b>0.91</b>	0.23	0.14
Vacil4	0.23	0.26	0.04	0.13	0.03	0.30	0.39	0.16	0.38	<b>0.86</b>	0.21	0.19
TryInn1	0.29	0.28	0.02	0.25	0.06	0.20	0.32	-0.01	0.50	0.22	<b>0.94</b>	0.52
TryInn2	0.41	0.34	0.11	0.26	0.22	0.34	0.33	0.09	0.51	0.28	<b>0.96</b>	0.59
Habit1	0.26	0.37	-0.06	0.15	-0.12	-0.04	-0.05	0.01	0.29	0.17	0.51	<b>0.95</b>
Habit2	0.28	0.44	-0.13	0.15	-0.10	0.03	0.02	-0.04	0.31	0.20	0.53	<b>0.98</b>
Habit3	0.11	0.35	-0.05	0.20	-0.13	0.05	0.04	-0.07	0.39	0.13	0.62	<b>0.93</b>

Next, we conducted two empirical studies. Data for both studies were separately collected from students who were SNS users. Students were recruited from different classes and their participation in both studies were voluntary. Students received 2% extra credit (bonus credit) for their participation. Both studies and their protocols for data collection were approved by the University's Institutional Research Board.

### **E.3. Study 1**

In study 1, a series of preliminary analyses were performed to ensure the absence of six artifacts that could compromise the quality of analyses: (1) low reliability of constructs, (2) low validity of constructs, (3) serious deviations from the normality assumption, (4) multicollinearity among the factors, (5) low goodness of fit of the measurement model, and (6) common method variance (CMV) bias. To this end, the descriptive statistics, reliability scores, and inter-construct correlations were calculated for the constructs in study 1, as outlined in Table E3. The results demonstrated that all constructs were internally consistent with Cronbach's alphas and Fornell and Larcker [14]'s composite reliability scores well above 0.7 [41]. Moreover, the results also demonstrated acceptable construct validity with square root of average variance extracted (AVE) scores over 0.7 and exceeding the corresponding correlations with other constructs, and the loadings of items on their pertinent constructs exceeding their cross loadings on other constructs (see Table E4) [50]. Furthermore, serious deviations from normality were not detected [21, 34]. Moreover, variance inflation factor (VIF) indices of less than 1.07 indicated that multicollinearity was not an issue in these data [34]. Moreover, we assessed the goodness of fit of the complete measurement model (including control variables) using CFA (see Figure E1). The results indicated an acceptable goodness of fit: *Chi-square (degrees of freedom: 387) = 499; CFI = 0.98; TLI = 0.98; IFI = 0.99; SRMR = 0.03; RMSEA = 0.03 (95% Confidence Interval: 0.02 – 0.04).*



*Chi-square (degrees of freedom: 387) = 499; CFI = 0.98; TLI = 0.98; IFI = 0.99; SRMR = 0.03; RMSEA = 0.03 (95% Confidence Interval: 0.02 – 0.04).*

**Figure E1** Complete Measurement Model using CFA in AMOS 26

Lastly, although three-wave data collection ( $t_1$ - $t_3$ ) reduced the likelihood of CMV bias in our data [23], we examined the potential existence of common method variance (CMV) to ensure that it did not distort the data. We used three different methods to minimize the effects of the

drawbacks of each CMV assessment method [26, 43]. First, we followed the suggestions by Pavlou et al. [42] to examine the matrix of inter-factor correlations (see Table E3). While very high correlations (i.e., in excess of 0.9) can be an indication of CMV, the correlations in our study were substantially lower, demonstrating that CMV is not an issue with our study. Second, Harman's single factor test was performed by subjecting the items of all factors to a principal component analysis (PCA) with no rotation. The aim of the test is to determine if a single factor emerges from the PCA that explains the majority (i.e., in excess of 50%) of the variance in the data, which is considered as an indication of CMV. This method produced 32 components that explained 100% of the variance, and the largest component captured only 25% of the variance. Therefore, CMV did not seem to be an issue in this study, based on this method.

Third, a "common latent factor" [26, 43] that captures the communal variance of all model indicators was added to the aforementioned CFA for the complete measurement model. The CFA model was estimated with and without this common latent factor, and the differences in loadings were found to be below the 0.2 cutoff (0.00 – 0.09). Taken together, all three aforementioned methods indicate that a bias as a result of CMV is unlikely to be pertinent in these data.

**Table E3.** Descriptive Statistics, Reliabilities, Square Root of AVEs (bold, Italic diagonal), and Correlations for Study 1 (n = 318)

	Mean (SD)	Skew (Kur.)	CR (Cr.)	1	2	3	4	5	6	7	8	9	10	11	12	13
(1) Ambivalence (t <sub>1</sub> )	3.14 (1.44)	0.23 (-0.85)	0.95 (0.93)	<b>0.88</b>												
(2) Neuroticism (t <sub>1</sub> )	3.39 (1.29)	0.13 (-0.49)	0.88 (0.87)	0.19	<b>0.84</b>											
(3) Disengagement - oriented Coping (t <sub>2</sub> )	1.35 (0.63)	1.89 (3.19)	0.96 (0.91)	0.30	0.20	<b>0.96</b>										
(4) Denial of Ambivalence (t <sub>2</sub> )	1.47 (0.77)	1.60 (1.65)	0.95 (0.91)	0.23	0.15	0.31	<b>0.95</b>									
(5) Indecision (t <sub>2</sub> )	3.28 (2.36)	1.04 (0.13)	0.95 (0.89)	0.54	0.23	0.28	0.30	<b>0.95</b>								
(6) Active Coping* (t <sub>2</sub> )	2.16 (1.01)	0.34 (-1.07)	0.96 (0.93)	0.14	0.12	0.20	0.18	0.19	<b>0.96</b>							
(7) Planning* (t <sub>2</sub> )	2.01 (0.97)	0.48 (-0.96)	0.97 (0.94)	0.22	0.15	0.30	0.23	0.20	0.66*	<b>0.97</b>						
(8) Trying to Discontinue (t <sub>3</sub> )	1.59 (1.01)	2.47 (3.24)	0.92 (0.88)	0.31	0.12	0.42	0.25	0.34	0.16	0.22	<b>0.92</b>					
(9) Duration of SNS Use (t <sub>3</sub> )	2.95 (1.63)	0.86 (0.12)	NA	0.07	0.18	0.21	0.21	0.19	0.15	0.24	0.21	<b>1.00</b>				
(10) Vacillation (t <sub>3</sub> )	3.08 (1.41)	0.38 (-0.61)	0.95 (0.92)	0.46	0.22	0.29	0.18	0.40	0.19	0.21	0.43	0.08	<b>0.91</b>			
(11) Trying to Innovate (t <sub>3</sub> )	3.88 (1.56)	-0.11 (-0.71)	0.94 (0.87)	0.11	0.02	0.15	0.21	0.13	0.21	0.20	0.03	0.14	0.16	<b>0.94</b>		
(12) Habitual Use (t <sub>1</sub> )	4.83 (1.41)	-0.74 (0.20)	0.96 (0.94)	0.02	0.13	0.04	0.02	0.07	-0.03	-0.01	-0.08	0.23	-0.02	0.39	<b>0.94</b>	
(13) Age (t <sub>1</sub> )	23.71 (4.94)	3.80 (5.78)	NA	0.12	-0.09	-0.07	-0.09	0.02	-0.13	-0.09	-0.03	-0.15	-0.02	-0.09	-0.14	<b>1.00</b>
(14) Gender (t <sub>1</sub> )	1.52 (0.50)	-0.08 (-2.01)	NA	0.03	-0.21	0.05	0.06	0.11	0.03	-0.02	0.06	-0.17	0.04	-0.01	-0.08	0.04

*SD: Standard Deviation; Skew: Skewness; Kur.: Kurtosis; CR: Composite Reliability; Cr. Cronbach Alpha; NA: Not Applicable; \* First order factors underlying the second-order reflective specification of compromise factor. Therefore, their high correlation is reasonable and expected.*

**Table E4.** Cross Loadings of Measures and Factors for Study 1 (n = 318)

	Ambiv	Neuro	Diseng	Denial	Indec.	Active Coping	Plan	Try Discont	Duration of Use	Vacillate	Try Innovate	Habitual Use
Ambiv1	<b>0.92</b>	0.16	0.30	0.21	0.45	0.16	0.24	0.31	0.08	0.47	0.08	0.03
Ambiv2	<b>0.92</b>	0.14	0.26	0.18	0.37	0.14	0.19	0.28	0.03	0.39	0.08	0.04
Ambiv3	<b>0.90</b>	0.18	0.32	0.26	0.46	0.14	0.20	0.31	0.11	0.40	0.11	0.06
Ambiv4	<b>0.77</b>	0.17	0.23	0.17	0.35	0.09	0.15	0.18	0.01	0.32	0.08	-0.04
Ambiv5	<b>0.91</b>	0.19	0.24	0.22	0.42	0.11	0.16	0.29	0.10	0.46	0.10	0.00
Neuro1	0.16	<b>0.87</b>	0.17	0.11	0.13	0.11	0.14	0.10	0.16	0.18	-0.04	0.10
Neuro2	0.21	<b>0.90</b>	0.18	0.15	0.23	0.11	0.14	0.14	0.19	0.23	0.02	0.12
Neuro3	0.10	<b>0.74</b>	0.16	0.12	0.10	0.10	0.10	0.05	0.10	0.13	0.05	0.11
Diseng1	0.30	0.20	<b>0.96</b>	0.48	0.29	0.19	0.31	0.41	0.19	0.28	0.14	0.04
Diseng2	0.28	0.19	<b>0.96</b>	0.51	0.30	0.20	0.26	0.40	0.21	0.28	0.16	0.02
Denial1	0.24	0.18	0.30	<b>0.97</b>	0.31	0.16	0.21	0.24	0.23	0.16	0.18	0.03
Denial2	0.21	0.10	0.38	<b>0.95</b>	0.29	0.18	0.22	0.24	0.18	0.18	0.22	0.01
Indec1	0.47	0.21	0.30	0.29	<b>0.96</b>	0.14	0.21	0.22	0.17	0.23	0.09	0.04
Indec2	0.41	0.15	0.27	0.31	<b>0.94</b>	0.14	0.20	0.23	0.24	0.19	0.15	0.04
Active1	0.17	0.13	0.21	0.19	0.17	<b>0.97</b>	0.65	0.17	0.15	0.22	0.20	-0.03
Active2	0.11	0.10	0.18	0.15	0.11	<b>0.96</b>	0.63	0.14	0.14	0.15	0.21	-0.04
Plan1	0.24	0.13	0.29	0.24	0.23	0.64	<b>0.97</b>	0.22	0.23	0.23	0.20	-0.02
Plan2	0.19	0.16	0.29	0.20	0.18	0.65	<b>0.97</b>	0.20	0.25	0.19	0.20	0.01
TryDis1	0.32	0.11	0.40	0.23	0.26	0.14	0.17	<b>0.93</b>	0.22	0.43	0.06	-0.09
TryDis2	0.26	0.12	0.38	0.23	0.18	0.15	0.23	<b>0.91</b>	0.17	0.38	0.00	-0.05
Use Int.	0.08	0.18	0.21	0.22	0.21	0.15	0.24	0.21	<b>1.00</b>	0.08	0.15	0.23
Vacil1	0.40	0.18	0.29	0.19	0.22	0.20	0.22	0.43	0.07	<b>0.93</b>	0.14	-0.06
Vacil2	0.43	0.16	0.24	0.13	0.20	0.16	0.17	0.37	0.07	<b>0.90</b>	0.12	-0.04
Vacil3	0.44	0.21	0.29	0.16	0.22	0.17	0.21	0.45	0.09	<b>0.94</b>	0.14	-0.04
Vacil4	0.39	0.26	0.23	0.17	0.16	0.17	0.17	0.30	0.05	<b>0.84</b>	0.18	0.07
TryInn1	0.08	-0.03	0.15	0.19	0.11	0.21	0.21	0.07	0.15	0.16	<b>0.95</b>	0.40
TryInn2	0.12	0.06	0.15	0.21	0.12	0.19	0.17	0.00	0.12	0.13	<b>0.93</b>	0.34
Habit1	0.05	0.12	0.06	0.03	0.03	-0.02	0.02	-0.06	0.20	0.02	0.39	<b>0.94</b>
Habit2	0.04	0.14	0.02	0.00	0.05	-0.03	-0.02	-0.09	0.24	-0.02	0.35	<b>0.95</b>
Habit3	-0.02	0.11	0.02	0.03	0.04	-0.04	-0.01	-0.07	0.21	-0.07	0.38	<b>0.95</b>

#### **E.4. Study 2**

The descriptive statistics, reliability scores, inter-construct correlations, and items-factors cross-loadings for study 2 are presented in Tables E5 and E6. The results demonstrated that all factors were internally consistent, they had acceptable construct validity, they were not seriously deviated from normality assumption, and they were not suspicious of multicollinearity issue.

Furthermore, similar to study 1, three different methods for assessing the potential CMV bias on our results (as explained in study 1) indicated that such a bias is unlikely to be pertinent in study 2 data.

**Table E5.** Descriptive Statistics, Reliabilities, Square Root of AVEs (bold, Italic diagonal), and Correlations for Study 2 (n = 299)

	Mean (SD)	Skew (Kur.)	CR (Cr.)	1	2	3	4	5	6	7	8	9	10	11	12	13
(1) Ambivalence (t <sub>1</sub> )	3.08 (1.46)	0.26 (-0.94)	0.95 (0.94)	<b>0.89</b>												
(2) Neuroticism (t <sub>1</sub> )	3.40 (1.33)	0.14 (-0.48)	0.88 (0.80)	0.27	<b>0.85</b>											
(3) Disengagement-oriented Coping (t <sub>2</sub> )	1.22 (0.44)	2.23 (5.99)	0.92 (0.84)	0.23	0.18	<b>0.93</b>										
(4) Denial of Ambivalence (t <sub>2</sub> )	1.40 (0.71)	1.90 (2.99)	0.95 (0.89)	0.22	0.16	0.30	<b>0.95</b>									
(5) Indecision (t <sub>2</sub> )	3.18 (2.32)	1.18 (0.65)	0.95 (0.90)	0.49	0.22	0.32	0.21	<b>0.95</b>								
(6) Active Coping* (t <sub>2</sub> )	2.13 (1.02)	0.40 (-1.05)	0.97 (0.93)	0.14	0.12	0.12	0.13	0.22	<b>0.97</b>							
(7) Planning* (t <sub>2</sub> )	1.93 (0.96)	0.63 (-0.79)	0.97 (0.94)	0.17	0.13	0.16	0.17	0.21	0.67*	<b>0.97</b>						
(8) Trying to Discontinue (t <sub>3</sub> )	1.46 (0.84)	2.81 (4.52)	0.90 (0.88)	0.26	0.17	0.28	0.18	0.21	0.11	0.11	<b>0.91</b>					
(9) Duration of SNS Use (t <sub>3</sub> )	2.87 (1.55)	0.85 (0.24)	NA	0.06	0.19	0.04	0.13	0.14	0.17	0.22	0.13	<b>1.00</b>				
(10) Vacillation (t <sub>3</sub> )	2.98 (1.34)	0.44 (-0.49)	0.94 (0.91)	0.43	0.21	0.20	0.17	0.33	0.18	0.17	0.37	0.04	<b>0.89</b>			
(11) Trying to Innovate (t <sub>3</sub> )	3.83 (1.55)	-0.06 (-0.66)	0.94 (0.87)	0.08	-0.04	-0.01	0.17	0.09	0.23	0.22	-0.03	0.08	0.10	<b>0.94</b>		
(12) Habitual Use (t <sub>1</sub> )	4.88 (1.39)	-0.77 (0.35)	0.96 (0.94)	0.03	0.11	-0.01	0.02	0.08	0.00	0.01	-0.06	0.22	-0.04	0.35	<b>0.94</b>	
(13) Age (t <sub>1</sub> )	23.73 (5.06)	3.74 (5.87)	NA	0.11	-0.09	-0.02	-0.07	0.02	-0.12	-0.07	-0.02	-0.16	-0.03	-0.08	-0.15	<b>1.00</b>
(14) Gender (t <sub>1</sub> )	1.50 (0.50)	-0.01 (-2.01)	NA	-0.02	-0.20	0.03	0.06	0.12	0.05	-0.01	0.00	-0.19	0.00	0.01	-0.06	0.05

*SD: Standard Deviation; Skew: Skewness; Kur.: Kurtosis; CR: Composite Reliability; Cr. Cronbach Alpha; NA: Not Applicable; \* First order factors underlying the second-order reflective specification of compromise factor. Therefore, their high correlation is reasonable and expected.*

**Table E6.** Cross Loadings of Measures and Factors for Study 2 (n = 299)

	Ambiv	Neuro	Diseng	Denial	Indec.	Active Coping	Plan	Try Discont	Duration of Use	Vacillate	Try Innovate	Habitual Use
Ambiv1	<b>0.92</b>	0.25	0.23	0.20	0.45	0.16	0.20	0.26	0.06	0.45	0.05	0.03
Ambiv2	<b>0.92</b>	0.23	0.19	0.18	0.38	0.13	0.16	0.23	0.02	0.36	0.06	0.04
Ambiv3	<b>0.91</b>	0.26	0.25	0.23	0.48	0.14	0.15	0.27	0.10	0.37	0.10	0.06
Ambiv4	<b>0.82</b>	0.22	0.20	0.17	0.39	0.08	0.13	0.15	0.00	0.30	0.05	0.01
Ambiv5	<b>0.91</b>	0.25	0.18	0.20	0.42	0.12	0.14	0.26	0.08	0.43	0.07	0.01
Neuro1	0.24	<b>0.89</b>	0.16	0.14	0.21	0.11	0.12	0.15	0.17	0.18	-0.11	0.05
Neuro2	0.29	<b>0.89</b>	0.13	0.13	0.27	0.11	0.13	0.19	0.20	0.23	-0.04	0.10
Neuro3	0.15	<b>0.76</b>	0.16	0.13	0.15	0.08	0.07	0.09	0.12	0.11	0.03	0.11
Diseng1	0.24	0.16	<b>0.94</b>	0.35	0.21	0.11	0.19	0.30	0.05	0.19	-0.02	0.00
Diseng2	0.19	0.16	<b>0.91</b>	0.39	0.21	0.12	0.10	0.23	0.03	0.18	0.01	-0.02
Denial1	0.21	0.18	0.38	<b>0.96</b>	0.26	0.12	0.16	0.17	0.16	0.14	0.15	0.03
Denial2	0.21	0.12	0.37	<b>0.94</b>	0.24	0.13	0.16	0.16	0.08	0.18	0.17	0.01
Indec1	0.47	0.26	0.25	0.26	<b>0.96</b>	0.14	0.19	0.19	0.17	0.20	0.08	0.05
Indec2	0.43	0.21	0.19	0.24	<b>0.95</b>	0.14	0.17	0.21	0.16	0.18	0.11	0.02
Active1	0.15	0.13	0.12	0.14	0.16	<b>0.97</b>	0.66	0.10	0.16	0.21	0.21	0.00
Active2	0.12	0.10	0.11	0.12	0.12	<b>0.97</b>	0.63	0.10	0.17	0.15	0.24	0.01
Plan1	0.19	0.10	0.16	0.19	0.21	0.65	<b>0.97</b>	0.12	0.20	0.18	0.22	-0.01
Plan2	0.15	0.15	0.15	0.14	0.16	0.65	<b>0.97</b>	0.07	0.23	0.15	0.21	0.03
TryDis1	0.27	0.17	0.26	0.17	0.21	0.07	0.03	<b>0.91</b>	0.14	0.35	0.02	-0.08
TryDis2	0.21	0.14	0.26	0.15	0.17	0.12	0.15	<b>0.90</b>	0.11	0.33	-0.05	-0.03
Use Int.	0.06	0.19	0.04	0.13	0.17	0.17	0.22	0.14	<b>1.00</b>	0.04	0.08	0.22
Vacil1	0.37	0.15	0.20	0.16	0.18	0.17	0.16	0.37	0.03	<b>0.92</b>	0.08	-0.07
Vacil2	0.41	0.17	0.17	0.13	0.19	0.15	0.13	0.33	0.04	<b>0.90</b>	0.06	-0.06
Vacil3	0.42	0.21	0.20	0.14	0.20	0.15	0.15	0.40	0.05	<b>0.94</b>	0.08	-0.07
Vacil4	0.34	0.22	0.14	0.15	0.13	0.19	0.15	0.23	0.01	<b>0.81</b>	0.12	0.05
TryInn1	0.04	-0.09	-0.02	0.15	0.10	0.22	0.22	-0.01	0.10	0.10	<b>0.95</b>	0.35
TryInn2	0.10	0.01	0.00	0.17	0.09	0.21	0.20	-0.03	0.06	0.08	<b>0.93</b>	0.30
Habit1	0.04	0.08	-0.01	0.03	0.01	0.01	0.02	-0.06	0.18	-0.01	0.34	<b>0.93</b>
Habit2	0.05	0.12	-0.02	-0.01	0.05	0.00	-0.01	-0.07	0.23	-0.04	0.31	<b>0.95</b>
Habit3	0.00	0.09	0.01	0.05	0.04	0.00	0.02	-0.04	0.21	-0.08	0.33	<b>0.95</b>

## Appendix F: Three-Step Latent Profile Analysis (LPA) in Study 2

Table F1 provides the information criteria goodness of fit indices for different number of profiles that were tested. Table F2 provides the result of parametric bootstrap likelihood ratio (PBLR) test for 3 profiles versus 2 profiles. Furthermore, Tables F3 and F4 provide the summary of three profiles based on the continuous indicators (Table F3) and the post-adoptive IS use behaviors as our dependent variables (Table F4).

**Table F1.** Information Criteria Values for Three-Step LPA Results in Study 2

Number of Profiles	Akaike's Information Criterion (AIC)	Bayesian Information Criterion (BIC)	sample-size-adjusted BIC (aBIC)	second-order-bias-corrected AIC (AICc)
1	5960.67	6012.47	5968.07	5962.14
2	5645.09	5726.50	5656.73	5648.76
<b>3</b>	<b>5454.05</b>	<b>5565.07</b>	<b>5469.92</b>	<b>5460.99</b>

**Table F2.** Parametric Bootstrapped Likelihood Ratio (PBLR) Test For 2 (H0) Versus 3 Profiles

H0 Log likelihood Value	-2800.545
2 Times the Log likelihood Difference	207.037
Difference in the Number of Parameters	8
Approximate P-Value	0.0000
Successful Bootstrap Draws	20

**Table F3.** Standardized Means and Standard Errors of Continuous Indicators Across Three Profiles of SNS Users in Study 2

Latent Profiles of Users	Size	Stats	Ambivalence	Neuroticism	Disengagement -oriented Coping	Denial of Ambivalence	Indecision	Planning	Active Coping
			Low Ambivalence	143	Mean	-0.27	-0.19	-0.48	-0.33
		S.E.	0.10	0.09	0.01	0.06	0.08	0.05	0.12
Ambivalent with Inflexible Responses	49	Mean	0.35	0.34	2.00	0.86	0.62	0.30	0.22
		S.E.	0.14	0.13	0.12	0.19	0.17	0.12	0.12
Ambivalent with Flexible Responses	107	Mean	0.20	0.09	-0.30	0.05	0.16	0.82	0.89
		S.E.	0.12	0.10	0.05	0.10	0.11	0.17	0.10

*Notes: Items are standardized for ease of interpretation; S.E. = Standard Error.*

**Table F4.** Summary of Standardized Means and Standard Errors of Post-Adoptive IS Use Across Three Profiles of SNS Users in Study 2

Latent Profiles of Users	Size	Stats	Trying to Discontinue SNS Use	Duration of Use	Vacillation	Trying to Innovatively Adapt SNS Use
			Low Ambivalence	143	Mean	-0.21
		S.E.	0.06	0.08	0.09	0.10
Ambivalent with Inflexible Responses	49	Mean	0.61	0.06	0.36	-0.14
		S.E.	0.22	0.14	0.13	0.11
Ambivalent with Flexible Responses	107	Mean	-0.01	0.26	0.22	0.31
		S.E.	0.10	0.12	0.10	0.09

*Notes: Items are standardized for ease of interpretation; S.E. = Standard Error.*

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