

Optimizing product trials by eliciting flow states: the enabling roles of curiosity, openness and information valence

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Abstract

Purpose – Product trials are an effective way to influence consumer attitudes. While research has established several factors that influence whether consumers will try a product or not, it is less understood how marketers can optimize the trial experience itself. The purpose of this paper is to explore flow as an optimal state and the factors that give rise to it during a product trial.

Design/methodology/approach – This research consists of three experimental studies in which people trial new music. This paper explores the ability of curiosity to optimize consumers' flow experience during the trial and their attitudes toward the trialed product. This paper manipulates curiosity before the trial using information about the music (Study 1) and music previews (Study 3) and also demonstrates that curiosity is naturally elevated among those high in openness to experience (Study 2).

Findings – The results demonstrate that curiosity before a product trial fosters an optimal experience during the trial in the form of flow states, defined as an enjoyable state of full engagement, which in turn mediates more positive attitudes toward the trialed product. This paper demonstrates that curiosity can be evoked using product information or a preview of the content and can vary based on individual differences in openness to experience. The relationship between curiosity and flow is moderated by the valence of the information that is used to elicit curiosity, such that negative-valence information thwarts the relationship.

Research limitations/implications – While the studies conducted by the authors focus on the positive influence of curiosity in the trial of music, the effects may be different for other products. These studies are also limited to two different manipulations of curiosity.

Practical implications – This research has implications for marketers, as it demonstrates the relevance of flow and how to enable it in product trials to optimize effectiveness. The manipulations also demonstrate how to manage the amount of information that is given to consumers before they trial a product.

Originality/value – This research reveals that flow states optimize the product trial experience. This research also advances the understanding of the relationship between curiosity and flow by moderating their



relationship with the valence of information that elicits curiosity. The findings also broaden the relevance of curiosity and flow in marketing by demonstrating their benefits within product trials.

Keywords Consumer behavior, Consumer attitudes, Consumer research, Flow, Curiosity, Product introduction

Paper type Research paper

Introduction

Marketers have a wide variety of promotional tactics to increase engagement with their brand. Of the various tactics, product trials have been well-established as one of the most effective ways to shape consumer attitudes and behavior (Smith and Swinyard, 1983). The support for the effectiveness of product trials is reflected in marketing practice, as product trials are becoming increasingly common in the marketplace, especially with digital services and software including applications “apps” (Cheng and Liu, 2012). Many common services such as the Spotify® music streaming app and Amazon Prime® offer a trial of their service or some of its features, often at a discounted rate (Green, 2019; Spotify, 2021).

Given the persuasive potential of product trials, marketing researchers have focused on factors that influence the likelihood of consumers deciding to trial a product, including individual differences (Steenkamp and Gielens, 2003), social/psychological processes (Iyengar *et al.*, 2015) and marketing mix elements (Donnelly and Etzel, 1973; Sinapuelas *et al.*, 2015). However, not all product trials are effective and they can in fact have a negative influence on consumers Lee (2015). This highlights the importance of understanding factors that increase the quality of the trial experience.

Despite the importance of managing the quality of a trial experience, research on the topic is relatively scant. Extant research has focused on the influence of prior advertising on the product trial experience and on consumers’ cognitive processing within the trial in particular (Kamins *et al.*, 2000; Chang, 2004; Micu and Coulter, 2012; Kempf *et al.*, 2006; Kempf and Smith, 1998; Wang, 2014a). However, there is evidence that affective responses formed in product trials override cognitive structures (Kim and Morris, 2007). Together, these findings suggest the need to explore factors that positively influence the affective aspect of a trial experience in addition to the cognitive aspect. Moreover, from a practical standpoint, expecting that consumers see an advertisement to encourage a product trial is rather unreliable. Consumers are exposed to brand and product information in several forms other than traditional advertising and marketers have the potential to provide pretrial information in a more reliable way, such as giving product details or reviews.

We address these gaps in the literature by exploring how to optimize product trials from an affective and cognitive perspective while influencing consumers using tactics beyond traditional advertising. Specifically, we explore how to induce a flow state during product trials, because flow is an optimal experience from both a cognitive and affective perspective (Csikszentmihalyi and LeFevre, 1989). Cognitively, flow is a state of seemingly effortless concentration in which full attention is devoted to the present moment (Csikszentmihalyi, 1990; Keller and Bless, 2008). Affectively, flow is renowned for its inherently enjoyable nature and for leading to extreme feelings of happiness (Csikszentmihalyi, 2000; Seifert and Hedderson, 2010; Tsaur *et al.*, 2013). Given these qualities, we expect that experiencing flow during a product trial will mediate increased attitudes toward that product. To leverage the power of flow, we also explore some factors that give rise to it.

A series of three studies in the context of sampling new music demonstrate that curiosity, which is experienced as a desire for information (Loewenstein, 1994), gives rise to flow during the product trial, which in turn mediates product attitudes. We demonstrate that curiosity can be increased by revealing written information about the product or by previews of the actual product, as well as by individual differences in openness to experience. We also demonstrate that the relationship between curiosity and flow is moderated by the valence of information that elicits

curiosity, such that negative-valence information thwarts the relationship by limiting the fluent experiences that are characteristic of flow.

In addition to advancing the product trial literature by demonstrating factors that optimize the trial experience, including the affective component, our findings also make other contributions to marketing theory and practice. From a theoretical perspective, our moderation findings contribute to the understanding of the relationship between curiosity and flow, such that the relationship depends on the valence of information that elicits curiosity, whereas the literature currently depicts a uniformly strong and positive relationship between the two. Our results also provide practical insights for marketers with regard to enhancing the quality of a product trial. Most notably, we highlight the role of curiosity and the importance of how much information is given before the trial. We demonstrate that too much or too little information thwarts curiosity and in doing so, limits flow during the trial and attitudes toward the product.

Conceptual development

Product trials

Product trials are regarded as one of the most effective ways to communicate information about a product and to subsequently increase consumer engagement (Smith and Swinyard, 1983). Product trials have been demonstrated to have a variety of benefits for both consumers and companies including increased learning, purchase intent, purchase and brand loyalty (Scott, 1976; Wang *et al.*, 2013). The effectiveness of product trials has been supported for a wide range of products, from tangible ones like beverages to less tangible ones like music and software (Cheng and Liu, 2012; Kempf and Laczniaik, 2001; Singh *et al.*, 2000). Product trials are also particularly beneficial in facilitating consumer adoption of new technologies (Soscia *et al.*, 2011; Wang *et al.*, 2013).

Product trials are a powerful marketing tool because the attitudes that result from them are stronger than attitudes resulting from other sources of product information, including advertising (Kamins *et al.*, 2000; Smith, 1993). This is in part because of their increased influence on information acceptance and belief confidence (Smith and Swinyard, 1988). Product trials also have superior effects on recall and purchase intent (Singh *et al.*, 2000). Once an attitude is formed from a product trial, it is difficult to change it with advertising, whereas attitudes formed by other forms of promotion are more malleable and subject to change (Smith, 1993). Given the persuasive power of product trials, research efforts have focused on how to encourage consumers to trial a product.

Several individual differences have been demonstrated to increase the likelihood of trial, including dispositional innovativeness, market mavenism, information seeking and product involvement and others decrease the likelihood of trial, such as perceived risk and the susceptibility to normative influence (Arts *et al.*, 2011; Schiffman, 1972; Steenkamp and Gielens, 2003). In their model of factors that influence the likelihood to trial a product, Steenkamp and Gielens (2003) offer several marketing factors that have a positive influence, including the amount of advertising for the product, the strength of the brand and the novelty of the product. Emotional arousal has also emerged as an effective way to encourage trial as elicited by the animation speed of product messaging (Duff and Sar, 2015) and product newness (Donnelly and Etzel, 1973).

While research has focused on how to get people to trial a product, research on how to optimize the product trial experience itself is relatively scant. This is problematic because oftentimes trials lead to feelings of discomfort and consumers subsequently disengage with the brand (Lee, 2015). This opens the door to a fruitful stream of research dedicated to understanding the keys to fostering a favorable product trial. Kempf and Smith (1998)

developed a model that is helpful in this regard, as it highlights the psychological processes that underlie effective product trials, which includes cognitive and affective aspects of the evaluation as well as the role of prior advertising. In addition to thoughts evaluating how diagnostic and credible the trial is, the importance of emotion is highlighted in their model and in particular, the degree of both pleasure and arousal that is generated by the trial.

Research has since focused on how exposure to prior advertising influences the product trial experience, with an emphasis on how it influences cognitive processing (Chang, 2004; Kempf and Laczniaik, 2001). For example, advertising prior to a trial can act as a schema to guide attention within product trials and can increase the perceived diagnosticity of the trial and the consumer's attitude confidence (Micu and Coulter, 2012; Moore and Lutz, 2000; Kempf and Laczniaik, 2001). Similarly, prior advertising can have a positive effect on attitudes by giving rise to positive confirmations, such that consumers look for and experience cues that confirm the performance or quality claims from the advertisement and thus influence their perceptions when looking back on the experience (Deighton and Schindler, 1988).

While much of the literature demonstrates that pretrial advertising has a positive influence on trial experience or resulting attitudes, research also demonstrates that sometimes it has no influence (Hoch and Ha, 1986). Related to this inconsistency, there is research which explores moderators of the relationship between pretrial advertising and product trial experiences, including gender (Kempf *et al.*, 2006; Wang, 2014a), consumer expertise and the nature of the trial experience (Kempf and Smith, 1998). For example, Yi (1993) reveals that for ambiguous product trials, in which it is difficult to evaluate the quality of the product, pretrial advertisements have increased capability to influence the trial experience. Micu and Coulter (2012) also reveal the importance of the nature of the product and the content of the advertisement, such that pretrial advertisements that use objective claims are most effective for utilitarian goods, whereas objective and subjective claims both positively influence post-trial attitudes for hedonic goods.

While the focus of the literature has been on factors that influence the cognitive aspect of product trials, research suggests that the affective responses formed in product trials override cognitive structures (Kim and Morris, 2007). With limited research exploring the factors that bolster the affective aspect of product trials and that efforts to influence the trial sometimes have limited to no influence (Hoch and Ha, 1986), our research advances the literature by exploring factors that optimize product trials, including the quality of both the affective and cognitive aspects of the experience. Specifically, we explore the state of flow as a way to optimize the trial experience and the factors that will enable it.

Flow: an optimal experience

Flow is often described as an optimal experience from both a cognitive and affective perspective (Csikszentmihalyi, 2000). Cognitively, flow is a state of full yet seemingly effortless attention in which one is fully absorbed in the present moment and from an affective perspective, it is renowned for its intrinsically enjoyable (autotelic) nature and for eliciting high levels of happiness (Csikszentmihalyi, 2000; Fredrickson, 2001). While subjectively experienced as having total control and a sense of calm, flow is a state of activation with moderate levels of arousal (Peifer *et al.*, 2014). These characteristics map perfectly onto the cognitive and affective processes that are suggested to drive effective product trials (Kempf and Smith, 1998). Specifically, it elicits emotional pleasure and arousal while also providing the necessary attentional resources to process and discern the diagnosticity of the trial from a cognitive perspective.

Although flow is characterized by several different experiences, it is driven by two underlying dimensions (Lavoie *et al.*, 2021). The first dimension, known as absorption,

involves sustained concentration over a long period of time (Dietrich, 2004). Some examples of experiences that exemplify this dimension include the merging of action and awareness, time distortion and loss of self-consciousness (Csikszentmihalyi, 2000). The second dimension, known as fluency, refers to the more inherently enjoyable nature of flow and the experience of everything going smoothly, often through mastery of a task (Lavoie and Main, 2019a; Lavoie *et al.*, 2021). This dimension is characterized by feelings of automaticity or an ease in one's actions and thoughts and a high degree of control (Engeser and Rheinberg, 2008; Moneta, 2012).

All flow states are comprised of both dimensions, but their duration and intensity differ based on the nature of the activity that elicits them. At one end of the continuum are deepflow states, which are what individuals typically associate with flow. Deepflow states are elicited by relatively complex activities, are longer in duration and are more intense. Examples of activities that may give rise to deepflow states include surfing on whitewater rivers (Mackenzie *et al.*, 2011), engaging in sexual activities (Privette, 1983) and cruising a boat across the ocean (MacBeth, 1988). On the opposite end of the continuum are microflow states, which are experienced far more frequently. Microflow states are elicited by relatively simple and short tasks, such as listening to music (Privette, 1983), reading (Magyaródi and Oláh, 2015) and playing video games (Lavoie and Main, 2019a).

Flow states can arise throughout the consumption process and everyday life in general (Csikszentmihalyi and Lefevre, 1989). For example, findings have demonstrated that flow can occur during information searches (Novak *et al.*, 2000), while engaging with advertising materials (Bittner and Schipper, 2014), during online shopping (Novak *et al.*, 2003) and during product usage (Keller and Bless, 2008). Flow is often facilitated by technology (Ghani and Deshpande, 1994), which is evidenced by its increased prevalence in activities such as playing video games (Keller *et al.*, 2011), internet usage (Koufaris, 2002) and online gambling (Lavoie and Main, 2019b).

We suggest that as an optimal state that engenders the cognitive and affective experiences that are fundamental to effective product trials (Kempf and Smith, 1998), experiencing flow during a product trial will positively mediate product attitudes. This is consistent with prior research which demonstrates flow's mediating effect of product attitudes in a variety of other related contexts, including product usage and information search (Hoffman and Novak, 2009; Korzaan, 2003; Hsu and Lu, 2003). Stated formally:

H1. Flow experienced during a product trial will mediate consumer attitudes toward the trialed product.

To leverage the benefits of flow we need it to emerge in the trial. We suggest that curiosity is a relevant antecedent to flow in the context of product trials given its practical relevance to the product trial context. Specifically, product trials provide the opportunity to learn new information about a product, which is the motivational crux of curiosity. Moreover, curiosity makes for a great antecedent because it has the potential to bolster both dimensions of flow, as we explain below.

Consumer curiosity

Curiosity is a state of cognitive deprivation that arises from an information gap between what one presently knows and what one desires to know (Loewenstein, 1994). Experienced as a desire to know, curiosity elicits a degree of arousal that motivates one to act and explore in the search of information (Hill *et al.*, 2016; Smith and Swinyard, 1988). As an aroused state that gives rise to increased engagement, curiosity should bolster the absorption dimension of flow. Thanks to the inherent pleasure that comes with acquiring new information when

one is curious, curiosity and satisfying curiosity more specifically, should also enhance the fluency dimension of flow.

Given its foundation in the amount of information that one has, one way to increase curiosity is by providing information about something, with curiosity following an inverted-U function based on the amount of information one is given (Loewenstein, 1994). That is, curiosity (the desire to know) increases as one acquires information about something, but there is a threshold point after which one is satisfied with how much one knows and additional information serves to decrease curiosity.

Although research on curiosity in marketing is relatively scant relative to its prevalence in the marketplace (Thomas and Vinales, 2017; Wang, 2019), research has shown that curiosity can have several different consequences for both consumers and marketers (see Table 1 for a summary of the literature). Seminal research in this area focused on the outcomes of curiosity as the result of individual differences (Kashdan *et al.*, 2004; Park *et al.*, 2004), but more recent research has explored how states of curiosity can be manipulated to influence consumer behavior (Daume and Hüttl-Maack, 2019; Wang, 2019).

The majority of research on the consequences of curiosity has focused on how it influences exploratory behavior. For example, findings have shown that curiosity increases variety seeking (Baumgartner and Steenkamp, 1996; Martenson, 2018), information seeking (Hsee and Ruan, 2016) and novelty seeking (Kashdan *et al.*, 2009). Furthermore, researchers have established that curiosity is linked to several positive marketing-related outcomes, including increased content sharing (Ho and Dempsey, 2010), increased satisfaction with information (Ozkara *et al.*, 2016), enhanced attitudes toward advertisements and products (Menon and Soman, 2002; Yang *et al.*, 2020) and increased purchase likelihood (Laran and Tsiros, 2013; Hill *et al.*, 2016).

Curiosity can also have positive consequences for consumers. For example, heightened curiosity can lead to increased learning (Marvin and Shohamy, 2016) and memory (Kang *et al.*, 2009) as it increases both the breadth and quality of information search (Menon and Soman, 2002). In addition, curiosity has been found to have a positive influence on psychological well-being (Gallagher and Lopez, 2007; Park *et al.*, 2004), positive affect (Koo and Ju, 2010) and personal growth (Kashdan *et al.*, 2009). However, curiosity can also produce negative consequences. For example, it can lead consumers to expose themselves to aversive stimuli (Kruger and Evans, 2009) or make indulgent choices (Wang and Huang, 2017). For marketers, curiosity's positive correlation with increased variety seeking may pose dangers regarding consumer loyalty (Martenson, 2018).

As explained above, we suggest that curiosity before a trial will facilitate flow during the trial based on the engaging and enjoyable aspects of curiosity. This hypothesis is supported by findings in other marketing contexts that demonstrate a strong positive relationship between the two (Hoffman and Novak, 2009; Mathwick and Rigdon, 2004). For example, Schutte and Malouff (2020) demonstrate that individual differences in curiosity enhance flow in creative tasks, which in turn mediates enhanced creativity (Schutte and Malouff, 2020). While Schutte and Malouff (2020) operationalize curiosity as an individual difference, we advance their findings by showing that curiosity can also be situationally induced to subsequently elicit flow, which is important for its value in marketing, as it makes the experience possible for a wider audience. We also advance their findings by demonstrating the relationship between flow and curiosity within a different psychological process – attitude formation. Stated formally:

- H2. Curiosity experienced before a product trial will enhance the flow experience during the product trial.

| Paper | Consequence(s) | Moderator(s) | Mediator(s) | Context | Measure |
|----------------------------------|---|-------------------------------------|---|--|----------------------------|
| Daume and Hüttl-Maack (2019) | Increased attitudes toward products | N/A | Enhanced expectations, positive affect | Advertising | State: manipulated |
| Yang <i>et al.</i> (2020) | Increased attitudes toward an advertisement | N/A | N/A | Advertising (virtual reality) | State: measured (mediator) |
| Thomas and Vinuales (2017) | Increased attitudes toward social media post, desire to engage in an experience | N/A | N/A | Social media | State: measured |
| Menon and Soman (2002) | Increased memory, learning, product evaluation, information search quality (time and attention devoted) | Time | N/A | Advertising (online) | State: manipulated |
| Wang (2019) | Increased preference for indulgent products (reward) | Threatening information | Reward-approach orientation | Advertising/shopping | State: manipulated |
| Wang and Huang (2017) | Increased likelihood to choose indulgent products (rewards) | Reward Satiation | Desire for information (reward-seeking goal) | Watching TV, reading | State: manipulated |
| Hill <i>et al.</i> (2016) | Increased purchase motivation | N/A | Satisfaction with mystery appeal | Advertising, websites | State: manipulated |
| Martenson (2018) | Variety seeking | N/A | Adventure proneness, novelty seeking, trips taken | Vacation/travel choices | Individual difference |
| Ho and Dempsey (2010) | Increased sharing of online content | N/A | Consumption of online content | Internet usage | Individual difference |
| Hsee and Ruan (2016) | Increased information seeking, exposure to aversive stimuli | Cognitive appraisal of consequences | N/A | Information seeking | State: manipulated |
| Kover (1995) | Increased involvement | N/A | N/A | Advertising (teaser ads) | Theoretical |
| Marvin and Shohamy (2016) | Increased learning | N/A | Disparity in anticipated and received reward | Answering trivia questions | Measured |
| Kang <i>et al.</i> (2009) | Increased learning, memory | N/A | Anticipation of reward | Answering trivia questions | State: measured |
| Trehan and Maan (2012) | Increased attention, interest | N/A | N/A | Advertising (teaser ads) | Theoretical |
| Baumgartner and Steenkamp (1996) | Increased information seeking and variety seeking | N/A | N/A | Product purchase, consumption information search | Measured |

Table 1.
Consequences of
curiosity literature

(continued)

| Paper | Consequence(s) | Moderator(s) | Mediator(s) | Context | Measure |
|--|--|---------------------------------|-------------|------------------------|--------------------------|
| Kashdan et al. (2004) | Exploratory behavior, absorption, well-being, openness to experiences | N/A | N/A | Individual differences | Individual difference |
| Kashdan et al. (2009) | Exploratory behavior, novelty seeking, openness to experience, personal growth | N/A | N/A | Individual differences | Individual difference |
| Gallagher and Lopez (2007) | Increased psychological well-being | N/A | Exploration | Individual differences | Individual difference |
| Park et al. (2004) | Increased psychological well-being | N/A | N/A | Individual differences | Individual difference |
| Ozkara et al. (2016) | Increased information satisfaction | N/A | N/A | Online search | State: measured |
| Pelet et al. (2017) | Enhanced flow | N/A | N/A | Social media usage | State: measured |
| Schutte and Malouff (2020) | Increased creativity | N/A | Flow | Idea generation | State: measured |
| Kruger and Evans (2009) | Seek harmful information | Time | N/A | Information seeking | State: manipulated |
| Laran and Tsiros (2013) | Purchase likelihood | Affect | N/A | Free gift offers | Uncertainty: manipulated |
| Goldsmith and Amir (2010) | Purchase likelihood | Cognitive appraisal | N/A | Free gift offers | Uncertainty: manipulated |
| Koo and Ju (2010) | Positive affect (pleasure, arousal) | Website atmospherics (graphics) | N/A | Online shopping | State: measured |

Table 1.

We also expect that certain people will be naturally more curious and as a result, more likely to experience flow in a product trial. We expect that openness to experience is an individual difference that should enhance curiosity given the willingness to engage with stimuli that it engenders ([Kashdan et al., 2004](#)). Broadly defined, openness to experience is “seen in the breadth, depth and permeability of consciousness and in the recurrent need to enlarge and examine experience” ([McCrae and Costa, 1997](#), p. 2). Furthermore, individuals who have high levels of openness to experience are driven to examine, which is related to a need to understand [Murray \(1938\)](#) and seek out new and novel experiences ([Zuckerman, 1979](#)). People who are highly open to experience are also more “open” to intellectual interests such as fantasy and emotions ([McCrae and John, 1992](#)).

We included openness to experience as an antecedent to curiosity based on the aforementioned properties and the fit with both curiosity and the product trial context. That is, openness to experience constitutes an increased desire to explore and expand ones breadth of experience, which translate perfectly into having increased curiosity before a product trial. Moreover, openness to experience is highly relevant to the context of product trials, as it relates to and supports trying new things.

The nature of openness to experience has been debated for many years, with recent research suggesting that much of the disagreement has largely arisen because of its multifaceted nature ([DeYoung et al., 2005](#)). Specifically, the personality dimension, openness

to experience, is now referred to as openness/intellect, as this more accurately reflects its two facets: openness, which is related to engagement with perceptual and esthetic domains, and intellect, which is related to intellectual engagement with ideas (DeYoung *et al.*, 2007).

Individuals who are high in openness would be considered artistic and perceptive in that they have “the ability and tendency to explore sensory and esthetic information through perception, fantasy and artistic endeavor,” whereas those high in intellect would be considered philosophical and clever, having “the ability and tendency to explore abstract information through reasoning” (DeYoung *et al.*, 2014, pp. 46–47). Importantly, both aspects of openness encompass increased ability and tendency to explore information, suggesting their inherent link with curiosity.

We suggest that the motivation to explore that is shared by both dimensions of openness to experience will manifest in curiosity before a product trial, especially toward a music product trial which is the context of the study. We expect this to be the case because a product trial for music presents abstract information to be determined as good or bad, which captures the intellect dimension, while it also provides sensory and esthetic information to be explored, which captures the essence of the openness dimension. Thus, the higher one scores in the openness/intellect dimensions, the more curious they should also be before a music trial. Combined with *H1* and *H2*, we offer the following serial mediation hypothesis.

- H3.* Those high in openness to experience will be more curious before the product trial, which will increase the strength of flow during the trial and together sequentially mediate more positive attitudes toward the product.

We also suggest that the relationship between curiosity and flow is more nuanced than previously suggested, such that it depends on the valence of information that elicits curiosity and that curiosity can have differential effects on the two dimensions of flow. We consider the valence of information as a moderating variable because of its practical relevance to the context of product trials. Consumers are exposed to a plethora of information about products, whether it be through traditional word of mouth, online reviews or on social media (Azemi *et al.*, 2020; Sen and Lerman, 2007). Importantly, the information that consumers receive is sometimes negative and sometimes positive (East *et al.*, 2007; Zhang *et al.*, 2017). We also chose valence as a moderating variable because we expect both positive- and negative-valence information to equally elicit levels of curiosity, but to differentially influence the flow experience.

In the context of this research, we suggest that it is possible for positive and negative information related to products like music to elicit equal curiosity given the subjectivity involved in rating intangible goods (Singh *et al.*, 2017) and thus, the possibility that one could still love a negatively reviewed song. Moreover, consumers have become skeptical of marketplace information such as reviews and they are often unsure whether or not to believe them (Sher and Lee, 2009; Reimer and Benkenstein, 2016). Lastly, while it may seem that negative reviews would not elicit as much curiosity, negative information, including that contained within online reviews, is often more engaging than positive (Bitter and Grabner-Kräuter, 2016), as evidenced by the negativity bias in the social transmission of information (Bebbington *et al.*, 2017; Ito *et al.*, 1998). It is likely therefore that after receiving negative information, consumers will want more information, which is the essence of curiosity. Considering these factors, both negative and positive reviews should evoke curiosity and leave people wanting to hear the song to decide for themselves.

We expect positive and negative information to differentially influence flow though, because using negative-valence information to elicit curiosity should thwart its relationship with flow. Because negative information is engaging (Bitter and Grabner-Kräuter, 2016), it

should still elicit flow experiences related to absorption when engaging with the product. However, the negative-valence information should lead to a disfluent experience. Consider the example of someone who seems to like the song once they start listening. The inconsistency between their experience and the prior beliefs set by the negative review will decrease processing fluency, which is an established outcome of inconsistency in information (Topolinski and Strack, 2009; Winkielman *et al.*, 2012). The difficulty in processing created by the confusion would create a sense of dissonance and discomfort which would be experienced as disfluent (Forster *et al.*, 2016). The other possibility is that someone does not like the song, so even though this would be consistent with the negative-valence information from the review, the experience will be disfluent because they are not enjoying it. Stated formally as a hypothesis:

H4. The valence of information that elicits curiosity will moderate the relationship between curiosity and flow, such that curiosity elicited by negative-valence information will thwart the relationship.

Combining *H1*, *H2* and *H4*, we suggest that curiosity before a product trial will enhance flow while consumers engage with the product during the trial but only if it is elicited by positive-valence information. Flow will in turn mediate their attitudes toward it. The proposed moderated mediation relationship is illustrated in Figure 1 below.

Overview of studies

We test our hypotheses across a series of three studies. Study 1 seeks to support the simple mediation relationship (*H1* and *H2*) while manipulating curiosity using written information about the product. Study 2 seeks to support the sequential mediation relationship (*H3*), such that those higher in openness to experience would be more curious before the product trial and in turn more likely to experience flow and have more positive attitudes toward the song. Study 3 seeks to moderate the relationship between curiosity and flow by manipulating the valence of information that elicits curiosity using product reviews (*H4*).

Study 1: curiosity via written product information

The goal of Study 1 is to provide initial support for the proposed mediation relationship. The literature suggests that providing information about a product will increase curiosity until a certain point in which more information will decrease curiosity (Loewenstein, 1994). We seek to demonstrate this by providing people with low, moderate and high amounts of information about the product before a trial. We will use music as the product to be trialed in each of our studies as it is a common product to first listen to samples of music on podcasts and music applications. We expect to find that those who received a moderate amount of information before the product trial would be most curious and as a result, have a stronger flow experience during the trial which in turn mediates increased attitudes toward the product after the trial.

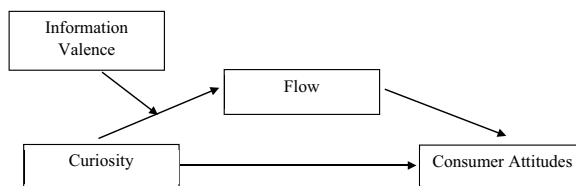


Figure 1.
Mediation model

Design and measures. Participants ($N = 407$ undergraduate students, $M_{\text{age}} = 20.54$, 44.2% female) were told that they would be in a product trial and would be listening to a clip of music and asked what they think about it. Participants were told that they were randomly selected to listen to progressive house music, to make it seem like the type of music was randomized, meanwhile everyone was listening to the same song (a 3-min clip of the song Indigo by the artist Fehrplay). The clip of music had no lyrics in it to minimize the influence of differing perceptions of the words and language.

Before listening to the clip of music, participants received one of the three sets of information with varying amounts of text about the music they were going to listen to, creating three conditions (information amount: low/moderate/high). One group was given a minimal amount of information, they were only told the type of music they would be listening to, so we expected curiosity to be relatively low among this group. The second group was given a moderate amount of information, comprised of three sentences explaining how the sounds within progressive house songs are put together and we expected curiosity to be highest among this group. The third group was given a large amount of information, including the information given in the moderate condition in addition to two paragraphs of information about how the sounds are made and the history of that type of music. We expected that this was too much information and participant curiosity would have decreased as a result. See [Appendix 1](#) for the full text used in the manipulations.

After the manipulation and before listening to the music, we assessed curiosity. Next, participants were asked to listen to the clip of music. Then, we assessed the dependent measures as outlined below along with other measures for exploratory purposes that are not reported here, as was the case in all studies, and finished with demographic questions related to age and gender.

Manipulation check (curiosity). We assessed curiosity using a two-item measure adapted to the context of listening to music ($r = 0.88$), “how curious are you about the song you are about to hear?” and “how eager are you to hear the song?” (1 = not at all, 7 = very much so) ([Wang, 2014b](#)).

Mediator (flow). Flow was assessed using the ten-item ($\alpha = 0.88$) flow short scale with questions pertaining to participants’ experience of listening to the song ([Rheinberg et al., 2003](#); [Engeser and Rheinberg, 2008](#)). Sample items include “I was totally absorbed in the experience,” “My thoughts seemed to happen naturally and on their own” and “I lost track of time.” See [Appendix 2](#) for the full scale, along with the full items of all scales from each study.

Product attitudes. To assess consumer attitudes toward the song we asked them to “please use the following items to describe your attitudes toward the song you just listened to” with three items ($\alpha = 0.97$) on seven-point semantic differential scales with the following anchors: Dislike/Like, Bad/Good and Negative/Positive.

Results and discussion.

Manipulation check. To demonstrate the effectiveness of the manipulation we compared curiosity ratings across the three conditions using a one-way ANOVA. The pattern of results supported the effectiveness of the manipulation [$F(2, 405) = 3.31, p = 0.04, \eta^2 = 0.016$], with curiosity following the inverted-u pattern ([Loewenstein, 1994](#)). Pairwise comparisons of the marginal means revealed that those who received the moderate amount of information were more curious ($M = 5.01, SD = 1.52$) than those who received a large amount of information ($M = 4.52, SD = 1.79, p = 0.01, d = 0.30$) and marginally more those who received minimal information ($M = 4.64, SD = 1.70, p = 0.07, d = 0.23$).

Mediator (flow). To demonstrate that curiosity influenced flow during the trial, we ran the same one-way ANOVA across conditions on reported experiences of flow. The results suggested that there were statistically significant differences in flow across the conditions [$F(2, 404) = 3.86, p = 0.02, \eta^2 = 0.019$]. Pairwise comparisons of the means revealed the expected pattern, with those in the moderate amount of information condition having the strongest flow experiences ($M = 3.79, SD = 1.14$) compared to those that received a large amount of information ($M = 3.55, SD = 1.33, p = 0.09, d = 0.20$) and those that received minimal information ($M = 3.37, SD = 1.27, p = 0.01, d = 0.36$).

Product attitudes. To demonstrate that curiosity would also increase attitudes toward the product that was trialed, we ran the same one-way ANOVA across conditions on attitudes toward the product, which also revealed significant differences across the conditions [$F(2, 404) = 4.32, p = 0.01, \eta^2 = 0.021$]. Pairwise comparisons of the means revealed the same pattern, with those in the moderate amount of information condition having the most positive attitudes toward the song ($M = 4.50, SD = 1.82$) compared to those that received a large amount of information ($M = 3.99, SD = 1.99, p = 0.03, d = 0.27$) and those that received minimal information ($M = 3.82, SD = 2.08, p = 0.01, d = 0.35$).

Mediation. The primary focus of Study 1 is to demonstrate that flow mediates the relationship between curiosity and product attitudes. To do this, we ran PROCESS model 4 in SPSS (Hayes, 2017) with 5,000 bootstrap resamples. Because we had three conditions in our predictor variable, we needed to compare the moderate information (curiosity) condition against both the low and high information conditions independently. To do so, in PROCESS we identified our predictor variable as multicategorical. This option allows for a comparison of all three conditions together, providing output of focal comparisons of the indirect effects across the conditions, ultimately producing relative indirect effects.

Because we wanted to demonstrate the superiority of the moderate information (curiosity) condition compared to the other two conditions, we coded the low information condition as “0,” the moderate information (curiosity) condition as “1” and the high information condition as “2.” We chose the sequential coding option because it provides the relative indirect effects of a moderate amount of information compared to both low information and high information. We expected to see that the indirect effect was strongest in the moderate information condition. Given the marginal statistical difference in flow between the moderate and high information conditions as demonstrated in the ANOVA results, we used a 90% confidence interval (CI) to test the mediation relationship, consistent with prior research when the relationship is weak to moderate (Nath, 2020).

The results supported our mediation hypothesis, such that the indirect effect was stronger among those who received a moderate amount of information compared to those who received a low amount of information, as evidenced by a positive and statistically significant relative indirect effect ($\beta = 0.4452, SE = 0.1582, 90\% CI = 0.1867, 0.7066$). This demonstrates that a moderate amount of information bolsters the indirect effect on product attitudes. The inverted-u pattern was further supported by the fact that the indirect effect weakened when people were given too much information, as evidenced by a significant negative relative indirect effect when a high amount of information was given compared to a moderate amount ($\beta = -0.2565, SE = 0.1521, 90\% CI = -0.5085, -0.0063$). The negative relative indirect effect demonstrates that providing too much information has a negative influence on flow and ultimately product attitudes.

Study 1 provides initial support that curiosity can be manipulated prior to a product trial and in turn it influences the nature of the trial experience and eventual attitudes toward the product. Specifically, a moderate amount of information prior to the trial facilitates curiosity, which fosters flow during the product trial and in turn mediates positive attitudes toward

the product. Together, these results suggest that curiosity can optimize product trials by eliciting flow, which benefits both the consumer and the company running the trial.

While the manipulation of curiosity in Study 1, which entailed providing information about how the product is made, produced statistically significant direct and indirect effects on attitudes toward the song, it produced only a relatively weak increase in curiosity. We believe that the significant indirect effect despite the relatively weak increase of curiosity highlights the strength of the relationship between flow and attitudes. That is partly because the indirect effect is the product of the linear relationship between X and the mediator (the a path) and between the mediator and Y (the b path) and that the relatively weak manipulation would have decreased the strength of the a path (Hayes, 2017). A significant indirect effect despite this means that the b path (flow to attitudes) was notably strong.

While we did find support for the proposed mediation relationship in Study 1 despite the relatively weak manipulation of curiosity, we want to find more powerful sources of curiosity, in part to bolster the effect size and the practical implications of the findings. We do so in future studies, including a stronger manipulation in Study 3 to increase power (Meyvis and van Osselaer, 2018). In Study 2, we seek to provide additional support for this mediation model with curiosity as generated by individual differences in openness to experience, which we expect to be a relatively strong source of curiosity.

Study 2: curiosity based on individual differences in openness to experience

The goal of Study 2 is to provide support for our mediation model based on individual differences. That is, people who are inherently more curious should be more likely to experience flow during a product trial, which will in turn lead them to evaluate the product more favorably. We suggest that those who are high in openness to experience should be naturally more curious prior to a product trial.

Design and measures. We asked participants ($N = 122$ Crowdfunder online panel workers, $M_{\text{age}} = 36.66$, 43.0% female) to listen to the same clip of music used in Study 1. We simulated a product testing scenario by telling participants that they would be evaluating a new genre of music called “Synthwave.” Before listening to the song, we measured curiosity to support our contention that those who score high in openness to experience will also be more curious before listening to the song. After participants had listened to the song, we assessed openness to experience, flow, attitudes toward the song and demographic variables related to age and gender. It was important to measure openness to experience and curiosity at separate times (after the experience vs prior to the experience, respectively) to guard against common method bias. It is also possible that individuals high in openness to experience simply enjoyed electronic music more, which would naturally enhance their experience of flow during listening. As such, we assessed how much participants liked electronic music to ensure that it was not confounded with openness to experience. This study followed a quasi-experimental design, as it only measured the independent variable.

Openness to experience. Openness to experience was measured using the big-five aspect scales (BFAS) scale (DeYoung *et al.*, 2007), which consists of two subcomponents: intellect and openness. The openness subscale is comprised of ten items ($\alpha = 0.848$), with four reverse-coded items. Sample items include “I enjoy the beauty of nature,” “I need a creative outlet” and “I seldom notice the emotional aspects of paintings and pictures” (r). The intellect subscale is also comprised of ten items ($\alpha = 0.861$) and four reverse-coded items. Sample items include “I like to solve complex problems,” “I avoid difficult reading material” (r) and “I avoid philosophical discussions” (r).

Curiosity. Curiosity was measured using the same two-item measure used in Study 1 ($r = 0.773$, Wang, 2014b).

Flow. We assessed flow in the same way as Study 1, using the flow short scale (ten items, $\alpha = 0.884$, Rheinberg *et al.*, 2003).

Product attitudes. We assessed attitudes toward the song by asking “Did you like the clip of music?” (1 = not at all, 7 = very much so).

Alternative explanation. We assessed liking of electronic music by asking “How much do you like electronic music?” (1 = not at all, 7 = very much so).

Results and discussion. To test the sequential mediation model (*H3*) we used Model 6 of the PROCESS macro in SPSS (Hayes, 2017). We ran two iterations – one for each component of openness as the independent variable, with curiosity and flow as sequential mediators and product attitudes as the dependent variable in both iterations. Both models provided support for the sequential mediation relationship. The intellect component of openness was related to enhanced curiosity before the trial ($b = 0.4480$, $SE = 0.1688$, $p < 0.01$), which increased flow during the trial ($b = 0.4674$, $SE = 0.0655$, $p < 0.01$) and together sequentially mediated enhanced attitudes toward the song, as evidenced by a significant indirect effect ($\beta = 0.1848$, $SE = 0.0817$, 95% $CI = 0.0370, 0.3616$). The results of the same analysis with openness as the independent variable demonstrated the same pattern, with it being related to enhanced curiosity before the trial ($b = 0.6086$, $se = 0.1654$, $p < 0.01$) and together with enhanced flow produced a significant indirect effect on attitudes toward the song ($\beta = 0.2544$, $SE = 0.0927$, 95% $CI = 0.0920, 0.4560$). Lastly, we ran a correlation to determine whether those who were high in openness to experience did not simply enjoy electronic music more. The results of this analysis demonstrated that openness to experience and enjoyment of electronic music were not correlated [$r(122) = 0.112$, $p = 0.22$].

Study 2 replicates the findings of Study 1 using an individual difference variable demonstrating that participants who were high in openness to experience were also inherently more curious before listening to the song. Consequently, they were more likely to enter flow during listening, which in turn mediated more favorable evaluations of the song. These findings demonstrate a novel individual difference variable (openness to experience) that facilitates flow. Having demonstrated that flow is key to consumer-related outcomes and curiosity is one way to enter flow, we designed Study 3 to provide a more robust understanding of the phenomenological relationship between curiosity and flow, as this could open the door for marketers to enhance flow opportunities for consumers.

Study 3: the moderating role of information valence

Study 3 has two goals. The first goal of this study is to obtain insight into why curiosity leads to flow, which we achieve by severing their relationship using negative-valence information to elicit curiosity. The second goal of Study 3 is to manipulate curiosity in a new, stronger way to increase the generalizability of our findings and to increase the practical value of the findings. Because the manipulation in Study 1 produced some marginal increases in curiosity, we seek a more powerful manipulation to strengthen the effect. While Study 2 demonstrated that individual differences in openness to experience provide a strong source of curiosity, we want to find something that marketers can control. We do so using a combination of product reviews and a preview of the content, which consumers are often exposed to and can influence their attitude formation and emotions (Huang and Korfiatis, 2015). We intended to use product reviews to demonstrate that equal levels of curiosity can be generated from negative- and positive-valence information in the marketplace. We used the preview of the song to manipulate the amount of information that people received before the trial and ultimately influence their degree of curiosity. In Study 3,

we again follow the logic of the inverted-u hypothesis used in Study 1 to manipulate curiosity, but we focus on the latter half of that relationship. That is, we provide a moderate amount of information or we provide too much information to decrease curiosity.

We designed a pretest to serve several goals. First, we wanted to find negative and positive reviews that elicited equal levels of curiosity. Second, the pretest was designed to find a way of thwarting curiosity that is naturally found in the marketplace. To do so, we used content previews, suggesting that after curiosity has been aroused by reviews, a long preview will provide too much information and will thwart curiosity. This is also something that marketers should be aware of, as providing consumers with too much information will reverse the benefits of curiosity. Lastly, it was important to establish these relationships in a pretest because we did not want to measure curiosity in the main study, to ensure that measuring it before the trial did not account for or bolster the effects on flow that were found in Study 1. We also did not want to assess curiosity after listening to the song because people's perception of curiosity in retrospect would likely be heavily influenced by the trial experience itself.

Pretest. Participants ($N = 219$ Crowdfunder online panel workers, $M_{\text{age}} = 34.57$, 50.2% female) either received two positive or two negative reviews of the song (see [Appendix 3](#) for descriptions) and either went straight to the song after the reviews or were given a 30-s preview prior to listening in an effort to thwart curiosity via too much information. While the reviews contained the same information about the song, they differed in that they focused on aspects of the song that were either poorly (negative review) or well done (positive review). Before listening to the song, we assessed curiosity using the two-item measure from the previous two studies ($r = 0.872$). After listening to the song, participants were asked to provide demographic information about their age and gender. The pretest thus followed a 2 (review valence: positive vs negative) \times 2 (song preview: yes vs no) between-participants design.

To determine the effectiveness of our manipulations, we ran a 2 (review valence) \times 2 (song preview) ANOVA on curiosity. The analysis revealed only a main effect of song preview [$F(1, 215) = 5.13$, $p = 0.024$, $\eta^2 = 0.023$], as participants who listened to the preview were less curious about the song ($M = 4.78$) than those who listened to it immediately after reading the reviews ($M = 5.28$). Importantly for the main study, participants who did not listen to the preview were equally curious regardless of whether they were given positive ($M = 5.30$) or negative reviews ($M = 5.26$, [$F(1, 215) = 0.018$, $p = 0.89$]). Together, these results support the efficacy of our manipulations – we found positive and negative song reviews elicit equal levels of curiosity and that providing a song preview following the reviews thwarts curiosity.

Main study design and measures. The main study used the same design as the pretest but without a measure of curiosity to reduce any potential demand effects of assessing it prior to the product trial and influencing the results by virtue of being measured. After listening to the song, participants ($N = 212$ Crowdfunder online panel workers, 51.4% female, $M_{\text{age}} = 36.02$) completed the final questionnaire, which included the flow measure, followed by the manipulation check regarding the valence of the reviews and demographic information related to age and gender. The manipulation check was asked following the dependent measures to limit the influence of asking that question on perceptions of the song.

Manipulation check. The manipulations were assessed using two items ($r = 0.967$), which were ranked on a seven-point scale. The two items asked participants, “were the reviews of the song that you read before listening” negative/positive and bad/good.

Flow. Two methods were used to measure flow to capture whether people experienced flow overall (yes/no) and to explore the nature of the linear relationship between curiosity

and the two dimensions of flow. First, the flow-quote method (yes/no) was used to assess the overall influence of the manipulations on flow (Csikszentmihalyi and Csikszentmihalyi, 1988). Next, we separated flow into its two primary dimensions – fluency (six items, $\alpha = 0.915$) and absorption (four items, $\alpha = 0.882$, Rheinberg *et al.*, 2003; Lavoie *et al.*, 2021) – to examine the nuanced relationships with curiosity and information valence.

Results and discussion.

Manipulation check. A 2×2 ANOVA on the perceived positivity of the song reviews revealed only a main effect of valence [$F(1, 209) = 223.27, p < 0.001, \eta^2 = 0.517$]. Participants in the positive review condition indicated that the song reviews provided to them were significantly more positive ($M = 6.25, SD = 1.27$) than did those in the negative review condition ($M = 2.87, SD = 1.96, d = 2.07$). Importantly, the mean rating of those who received positive reviews was on the positive side of the neutral scale midpoint (4) and the mean rating of those who received negative reviews was on the negative side of the scale midpoint.

Flow. To test information valence's ability to thwart the relationship between curiosity and flow overall, we ran Model 1 of the PROCESS Macro in SPSS using the curiosity manipulation (preview versus not) as the independent variable, the dichotomous measure of flow as the dependent measure and information valence as the moderator variable. This model was selected because it allows for a dichotomous dependent variable. The analysis revealed a significant interaction between curiosity and information valence ($\beta = 1.408, SE = 0.5583, 95\% CI = 0.3139, 2.5024$). Furthermore, analysis of the conditional effects of curiosity on flow for positive and negative reviews revealed a significant positive relationship between curiosity and flow for those who received positive information about the song ($\beta = 0.9053, SE = 0.3951, 95\% CI = 0.1309, 1.6797$), but a nonsignificant relationship among those who received negative information ($\beta = -0.5028, SE = 0.3945, 95\% CI = -1.2759, 0.2703$). This suggests that curiosity leads to flow when it is elicited by positive information, but not when it is elicited by negative information.

Next we sought to examine the relationships between curiosity, information valence and the two dimensions of flow. A 2 (preview) $\times 2$ (review valence) ANOVA on fluency revealed a significant interaction [$F(1, 209) = 3.90, p = 0.05, \eta^2 = 0.018$]. A planned comparison of the two curiosity conditions indicated that those who read positive reviews had a more fluent experience ($M = 5.10, SD = 1.45$) than those who read negative reviews [$M = 4.36, SD = 1.50, F(1, 209) = 7.70, p < 0.01, d = 0.50$]. However, a planned comparison between the two curiosity conditions in relation to absorption suggests that those who read positive reviews did not differ in absorption ($M = 3.94$) from those who read negative reviews [$M = 4.01, F(1, 209) = 0.065, p = 0.80$]. Together, these results suggest that curiosity elicited by negative information does not enhance flow because of thwarting the fluency aspect of it.

Study 3 shows that the relationship between curiosity and flow can be prevented by using negative-valence information to elicit curiosity, which provides a keen insight into this relationship. Although curiosity facilitates flow's characteristic experiences of fluency and absorption, the experience of fluency is limited when curiosity is elicited via negative-valence information. Study 3 also provides insight into marketing strategies that can be used to elicit curiosity and flow. In particular, the results demonstrate that while content previews can elicit curiosity, if they give too much information they can backfire.

General discussion

The results of this research demonstrate that curiosity prior to a product trial of music facilitates entering the optimal state of flow state while listening to the music, which in turn mediates positive attitudes toward it. We demonstrate that curiosity can be manipulated by

the amount of product information or a sample of the product and people who are more open to experience are naturally more curious before a product trial. Furthermore, we elucidate how curiosity produces flow by showing that their relationship is dependent on the valence of the information that is used to elicit curiosity. Curiosity elicited from positive information facilitates both the fluency and absorption dimensions of flow, but when curiosity is elicited via negative information, the fluency aspect of flow is thwarted. These findings make several contributions to marketing theory and practice as discussed below.

Theoretical contributions

The primary contribution of this research is demonstrating novel factors that positively influence the quality of a product trial experience, including both the affective and cognitive aspects and in doing so, consumer attitudes toward the trialed product. Extant research has focused on factors that influence the likelihood of engaging in a product trial or not (Steenkamp and Gielens, 2003), whereas the factors that influence the quality of the trial have been largely overlooked. Of the limited research that has explored this topic, it has focused on the ability of advertising to influence the cognitive aspects of aspects of attitude formation within a product trial (Kempf and Laczniak, 2001). Our research extends these findings by demonstrating how to use curiosity to encourage the optimal state of flow (Csikszentmihalyi, 1990). Moreover, while the extant literature focuses on the ability of advertising to influence the product trial experience, sometimes demonstrating that it does not have any influence (Hoch and Ha, 1986), our studies contribute to this by showing the effectiveness of content previews and written descriptions of the product.

Our moderation findings also advance the literature by explicating the nature of the relationship between curiosity and flow. The current literature suggests a uniformly strong and positive relationship between curiosity and flow, with curiosity as an antecedent to flow (Kashdan *et al.*, 2004; Schutte and Malouff, 2020). Some researchers have gone as far as to posit curiosity as a dimension of flow (Hoffman and Novak, 1996; Ozkara *et al.*, 2016; Pelet *et al.*, 2017). We contribute to this overall discussion by demonstrating that curiosity can exist separate from flow. We also demonstrate that the relationship is more nuanced than previously thought. In particular, the relationship depends on the valence of information that elicits curiosity. Our findings also clarify why the two are related, such that the relationship is partly based on the ability for curiosity to bolster fluency, which accounts for the inherently enjoyable aspect of flow. This is also consistent with findings that curiosity can elicit pleasure in obtaining new information (Litman, 2005).

Our findings also have theoretical implications for the persuasion and customer acquisition literatures. The combination of curiosity and flow was capable of increasing attitudes toward a new song from a relatively unknown genre of music. This is an especially noteworthy from a persuasion standpoint given the powerful attitudes that people form toward musical genres, which generally occurs because of music's importance to identity (North and Hargreaves, 1999). It is important to note the role of the indirect effect in our findings and thus, the importance of flow in attitude change. Curiosity did not have a particularly strong direct effect on attitudes in our studies, but it did have a strong indirect effect through flow. That is, our results suggest that curiosity's role in attitude change helps people become fully engrossed in a product trial in an enjoyable way (i.e. flow). Our results suggest that flow is what is most important in driving attitude change and curiosity is one way to encourage it to happen.

By demonstrating that curiosity can influence flow while listening to music, our research also contributes to the emerging literature that reveals flow can be elicited by factors beyond the balance between high levels of skill and task demands has become convention in flow

research (Keller *et al.*, 2011). Moreover, in demonstrating an individual difference factor (i.e. openness to experience) that is capable of facilitating flow via increased curiosity, our results also contribute to research on individual difference antecedents to flow, which has identified the importance of optimal stimulation levels (Steenkamp and Baumgartner, 1992) and autotelic personalities (Hoffman and Novak, 1996).

Practical implications

Our findings also make several contributions to marketing practice. Most notably, our results demonstrate how marketers can use information to optimize the trial of their product and why they must be careful about how much information is given. For example, in Study 1, we demonstrate that giving too little or too much information limited curiosity and in turn flow and product attitudes. It is common to provide consumers with a preview of the product or service, but as we demonstrate in Study 3, a preview can provide too much information and subsequently decrease curiosity. Our manipulations also demonstrate that marketers do not need to rely on advertising to influence the trial experience, which can be quite expensive. Revealing product information and giving a preview can increase curiosity and can be done at minimal cost and done right before the trial itself.

Our findings also highlight the relevance of flow to marketers as an optimal experience and the benefits that it has in product trials. As discussed above, our results suggest that flow is the underlying mechanism driving attitudes and curiosity is one way to encourage it to happen in product trials. This has practical implications in that marketers should make efforts to encourage flow in other ways, as situational factors other than the product itself would be likely to influence flow during a trial. Controlling the environment to allow for full attention to be paid to the product by reducing distractions and the potential for negative emotions would help foster the absorption dimension of flow. Sounds and visuals could also be added to the experience to enhance the fluency of the experience, as would ensuring the right amount of challenge if the product is mastery or performance related (Csikszentmihalyi, 2000).

The ability for curiosity and ultimately flow to drive attitude change toward a new type of music in such a short amount of time also has important implications for practitioners with regard to best practices in customer acquisition and for companies that are continuously releasing new products. This is because of the relative intolerance that people tend to have to new kinds of music, as music tastes are tightly linked to one's identity (Tarrant *et al.*, 2002). Indeed, it is possible that curiosity and flow can be used to mitigate psychological barriers to trying new products and to produce meaningful attitude change (Roy and Lahiri, 2004; Saine *et al.*, 2018).

It is important to note that not all sources of information about a product will elicit equal amounts of curiosity. Marketers should consider what information to leak to consumers to peak their curiosity in a way that has the strongest effect. This is evidenced when comparing the strength of the manipulations in Studies 1 and 3. In particular, our results from Study 1 suggest that providing information on how the product is made may not be as powerful in eliciting curiosity as showing teasers of the product itself, which was used in Study 3. This suggests that when possible, marketers should try to reveal small, attractive aspects of the product itself to enhance curiosity. However, we only used two different sources of information to manipulate curiosity, so future research should explore other avenues.

Limitations and opportunities for future research

Our findings and the limitations of our studies open the door for many potentially fruitful future inquiries. Having demonstrated flow as a mediating mechanism of product attitudes

in product trials, future research can explore other ways to foster flow. For example, research could explore how different forms of advertising, including the nature of information they provide, influence flow through constructs like affect and familiarity, which should contribute to the fluency of the experience (Topolinski and Strack, 2009). Based on our moderation findings, it is important for advertising to elicit a positive frame to induce a more fluent and enjoyable trial experience. With regard to different types of advertising, this suggests that transformational advertising, which is focused on influencing the experience of using a brand and making the usage experience richer, warmer and more exciting (Aaker and Stayman, 1992) should be superior to other forms of advertising such as informational ads which are focused on building awareness. Within transformational advertising, the nature of the information, including the visual or audible stimulation (Creusen *et al.*, 2010), could also be manipulated to influence the trial experience, as consumers try to embody the affective experience shown in the advertisement.

There are also opportunities to explore how to influence the trial of different types of products and how the relationships we demonstrate may differ. For example, in Study 3, positive and negative reviews elicited equal curiosity. We expect that this effect was in part driven by the intangible, subjective nature of the product (i.e. music) that our participants trialed. It would be interesting to see if positive and negative reviews would equally influence curiosity of more tangible goods and ultimately, how they would influence flow when trying them.

Our findings are also limited in that they only deal with a selected few manipulations of curiosity. Future work should explore other methods of manipulating curiosity. In his seminal writing, Berlyne (1954) provides insight into curiosity manipulations by distinguishing two types of curiosity: perceptual and epistemic curiosity. Perceptual curiosity is evoked and sustained by novel perceptual stimuli, which tends to be primarily visual, but can also include hearing, touch, smell and taste (Collins *et al.*, 2004). While perceptual curiosity is related to novelty-seeking through sensations (Zuckerman, 1979), epistemic curiosity is described as a drive “to know,” and is thus more related to information seeking (Spielberger and Starr, 1994).

Our results also portray a positive relationship between curiosity, flow and ultimately product attitudes. However, it would be intriguing to explore the negative consequences of curiosity. For instance, it is possible that stimulating curiosity toward a product category may backfire via deferred choice, leading to decision paralysis and difficulty in choosing between many comparable products by increasing the desire to explore other products (Diehl, 2005). Ultimately, there appear to be many avenues for future research related to optimizing product trials and we hope that our findings will spark the curiosity to explore them.

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Appendix 1. Study 1 manipulations

- Low information condition:

You have been assigned to listen to progressive house music.

- Moderate information condition:

You have been assigned to listen to progressive house music.

Progressive house tunes often feature a long build-up section followed by a breakdown and then a climax. Progressive songs slowly increase the amount of different sounds layered onto each other like slowly adding pieces to a puzzle. You can hear different sounds being introduced one at a time, eventually combining into the larger pattern.

- High information condition:

You have been assigned to listen to progressive house music.

Progressive house tunes often feature a long build-up section followed by a breakdown and then a climax. Progressive songs slowly increase the amount of different sounds layered onto each other like slowly adding pieces to a puzzle. You can hear different sounds being introduced one at a time, eventually combining into the larger pattern.

Electronic music is produced from a wide variety of sound resources – from sounds picked up by microphones to those produced by electronic oscillators (generating basic acoustical wave forms such as sine waves, square waves and sawtooth waves), complex computer installations and microprocessors – that are recorded on tape and then edited into a permanent form.

The progressive house genre features elements of dub, deep house, Italo house, big riffs and extended track lengths. Track tempos typically range from 120 to 134 beats per minute. The roots of progressive house can be traced back to the early 1990s rave and club scenes in the UK, Europe, Australia and Northern America. A combination of US house, UK house, Italian house, German house and techno largely influenced one another during this era. The term was used mainly as a marketing label to differentiate new rave house from traditional American house.

Appendix 2. Measurement items

Flow short scale (ten items; Rheinberg et al., 2003; Engeser and Rheinberg, 2008)

Please rate the following measures from 1 = not at all to 7 = very much based on your experience playing the game (listening to music).

Fluency subscale (six items)

- (1) My thoughts ran fluidly and smoothly
- (2) I knew what I was doing each step of the way
- (3) I felt that I had everything under control
- (4) I had no difficulty concentrating
- (5) My mind was completely clear
- (6) My thoughts seemed to happen naturally and on their own

Absorption subscale (four items)

- (1) I was totally absorbed into the experience
- (2) I felt just the right amount of challenge
- (3) I lost track of time
- (4) I was completely lost in thought

Openness to experience (BFAS scale, DeYoung et al., 2007)
1 (strongly disagree) to 5 (strongly agree).

Openness subscale

- Enjoy the beauty of nature.
- Believe in the importance of art.
- Love to reflect on things.
- Get deeply immersed in music.
- Do not like poetry. (R)
- See beauty in things that others might not notice.
- Need a creative outlet.
- Seldom get lost in thought. (R)
- Seldom daydream. (R)
- Seldom notice the emotional aspects of paintings and pictures. (R)

Intellect subscale

- Intellect Am quick to understand things
- Have difficulty understanding abstract ideas. (R)
- Can handle a lot of information.
- Like to solve complex problems.
- Avoid philosophical discussions. (R)
- Avoid difficult reading material. (R)
- Have a rich vocabulary.
- Think quickly.
- Learn things slowly. (R)
- Formulate ideas clearly.

Flow questionnaire (Csikszentmihalyi and Csikszentmihalyi, 1988)

“My mind isn’t wandering. I am not thinking of something else. I am totally involved in what I am doing. My body feels good. I don’t seem to hear anything else. The world seems to be cut off from me. I am less aware of myself and my problems.”

“My concentration is like breathing I never think of it. When I start, I really do shut out the world. I am really quite oblivious to my surroundings after I really get going.”

“I am so involved in what I am doing. I don’t see myself as separate from what I am doing.”

Appendix 3. Study 3 song reviews

Negative-valence reviews

Song review 1

“I didn’t like the way they mixed the fades with each other. They seemed to be choppy and too distinct from each other. The same for the bass and the drops, they didn’t work together. Not much synchrony throughout.”

Song review 2

"I didn't like this piece of music. They did not put the highs and lows together very well. I also did not like how they contrasted the different beats, they didn't fit together. Confusing song."

Positive-valence reviews

Song review 1

"I really liked the way they progressively transitioned with the fades to harmonize the different beats into one continuous rhythm. The bass was also mixed perfectly with the drops. Incredible synchrony throughout."

Song review 2

"Really nice piece of music. They had a nice balance of ups and downs. I liked how they contrasted different beats throughout, they really fit with each other. Powerful song."

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