Consumer Microflow Experiences

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Abstract

This research explores relatively short, low intensity flow states, called *microflow*, and demonstrates that they differ from their longer, more complex *deepflow* variants with regards to antecedents. As an advancement to flow theory, we demonstrate that the ideal condition to elicit *microflow* is when skills are slightly higher than the difficulty of the task. Importantly, despite being relatively shorter, *microflow* experiences still have a strong positive influence on consumer attitudes. Our research also advances theory by demonstrating that the two dimensions of *microflow* have different relationships with the level of difficulty and consumer attitudes. We discuss both theoretical and practical implications.

Keywords: *flow, microflow, consumer behavior, consumer attitudes*

Introduction

Flow is a highly enjoyable state of full, yet seemingly effortless attention (Csikszentmihalyi & Lefevre, 1989). Flow is experienced in a variety of consumption contexts such as searching for information online (Huang 2006), engaging with advertising materials (Bittner & Schipper 2014), and the consumption of products (Gupta & Kabadayi 2010), most notably those leveraging digital technology (Ghani & Desphande 1994). Flow is renowned for its positive consequences related to enjoyment and has been shown to influence consumer attitudes and behavioral intentions (Korzaan 2003; Tomaseti, Ruiz & Reynolds 2009).

While it is apparent that flow is important to both marketers and consumers, there remains a need to further develop our understanding of flow and how marketers can facilitate it (Schiefele & Raabe 2011). In particular, there remains concern over flow's dimensionality (Schiefele 2013; Engeser 2012a) and how to manipulate it (Fong, Zaleski & Leach 2015; Keller, Ringelhan, & Blomann 2011). Our research seeks to address these concerns by highlighting the fact that flow states differ in complexity, and may thus be nuanced in their facilitation. Flow is most commonly thought of in relatively complex tasks (e.g. professional sports) and thus have longer, more intense durations, which would be called *deepflow* or *longflow* (Csikszentmihalyi 2000). However, flow can also happen in less complex tasks (e.g. listening to music, completing puzzles) which have shorter, less intense durations and has been referred to as *shortflow*, or *microflow* (Nakamura & Csikszentmihalyi 2014). Although flow theorizing and the majority of research follow the conceptualization of *deepflow*, it is *microflow* that consumers often experience while using products or engaging with marketing materials.

This research explores how to facilitate *microflow* in an effort to test the underlying assumption of flow theory (Csikszentmihalyi 1975) that the principles for entering flow are

universal and thus the same for all variants. We also test the assumption that the positive consequences are universal. Through a series of three studies, we demonstrate that while *microflow* has strong positive benefits for consumer attitudes, it is uniquely facilitated. Flow theory suggests that flow is experienced at the upper boundary of one's abilities, when there is a balance of high skills with high task demands (Csikszentmihalyi 1975). However, we demonstrate that given the relative decrease in complexity and duration of *microflow*, the appropriate balance between challenge and difficulty is different, such that *microflow* happens when there is a surplus of skill.

Our results also demonstrate that the two dimensions of *microflow* have different relationships with task difficulty. One dimension is related to things progressing well and is epitomized by feelings of control and efficient mental processes. The second dimension is related to concentrating on something for an extended period and is exemplified by losing track of time. In shorter tasks, having slightly superior skills to the demands of the task provide the highest degree of flow's dimension related to control and fluent thoughts without a decrease in the dimension related to concentration. However, we demonstrate that time moderates this relationship, such that as the duration of the task lengthens, the ease of the task will have a detrimental effect on the dimension related to concentration and thwart flow. While both dimensions mediate positive consumer attitudes, their relative importance differs across tasks of varying difficulty.

These findings make multiple theoretical advancements to the flow literature, including the way that flow is studied. They also provide practical implications for effective product design and marketing practices. We discuss the implications of our findings for research and practice, including areas for future study.

Conceptual Development

Flow

Flow is a psychological state of deep, yet seemingly effortless involvement (Csikszentmihalyi & LeFevre 1989). Flow was originally conceptualized through interviews with people who described an experience of complete absorption in a task that elicited extraordinary levels of enjoyment. Nine common characteristics were identified from the descriptions of flow (Csikszentmihalyi 1975). Three were thought of as facilitators: a matching of skills with the task demands, clear goals, and unambiguous feedback. The rest describe the phenomenology of flow: concentration on the task at hand, a merging of action and awareness, a loss of self-consciousness, a distorted perception of time, a sense of control, and an intrinsically rewarding experience (Martin & Jackson 2008).

Despite flow states being treated equally in most research, Csikszentmihayli (2000) conceptualized differences in flow states based on the nature of the activity in which the state was experienced. For the sake of distinguishing flow states, the activities and behaviors involved in them can be placed on a continuum from extremely low to extremely high complexity. The range in complexity across flow-inducing activities give them inherent differences in both duration and intensity. At one end of the spectrum are *microflow* states, defined as flow states elicited within simple tasks that are relatively shorter in duration and have lessened intensity (Nakamura & Csikszentmihalyi 2014). One example of a task that would elicit *microflow* is doodling because the task is relatively simple, with routine action and thought. Importantly, despite being relatively short and of low intensity, doodling also has the primary facets of flow in that it allows one to become absorbed in the activity and is enjoyable. Listening to music is another example of a simple task that elicits *microflow* (Privette 1983), while tasks slightly more

complex than listening to music, such as reading and studying have also been conceptualized as *microflow* (Magyaródi & Oláh 2015).

On the opposite end of the spectrum are *deepflow* or *longflow* experiences, which are flow states derived from complex activities like scaling a mountain, pitching a perfect game in baseball and painting a masterpiece. Cruising a ship across the ocean (Macbeth 1988), whitewater river surfing (Mackenzie, Hodge & Boyes 2011) and sex (Privette 1983) have all been conceptualized as *deepflow* activities. These tasks can elicit *deepflow* because they are more complex, require a larger skillset, are longer in duration and relatively more intense. These states differ from *longflow* in that they have the potential to elicit a more transformative experience given the challenge they provide over a longer period of time (Csikszentmihalyi 1975). *Deepflow* states are the most characteristic flow experiences, and are what most people associate with flow, as people successfully push their physical and mental abilities during these experiences.

Despite the aforementioned differences in flow states ranging from *microflow* to *deepflow*, by definition all of these flow states should elicit each of the characteristic phenomenological experiences of flow (e.g. losing track of time, thoughts and actions seem to be happening naturally and on their own, sense of control; Csikszentmihalyi 1975; 2000). For example, despite being a simple task requiring little skill, listening to music could give rise to *microflow*, as someone becomes totally absorbed in the song, the experience progresses in a smooth and efficient manner accompanied by feelings of control, and it ultimately leads to a high level of enjoyment. However, given their added complexity, *deepflow* states have the potential to elicit more enjoyment than *microflow* states, to the point of ecstasy (Privette 1983).

While we have depicted two opposite ends of the flow spectrum for conceptualization, most flow states are somewhere in the middle, but often closer to *microflow*. The shorter, less

intense *microflow* experiences are more abundant, happening in everyday life (Csikszentmihalyi & LeFevre 1989), at work (Eisenberger et al. 2005; Moneta 2017), while chatting with others online (Shoham 2004), searching information online or even within experiential tasks (Novak, Hoffman & Duhachek 2003). Perhaps the context most conducive to flow is gambling, and with slot machines in particular, where it can be difficult to pull consumers out of a flow state (Lavoie & Main 2019). It is the more common *microflow* experiences that we are concerned with facilitating in this research.

Several marketing-related factors have been demonstrated to facilitate flow. However, despite the fact that flow states differ, they have been treated as equivalent and explored as such with regards to antecedents. In their seminal work, Hoffman and Novak (1996) proposed several antecedents to flow in an online context, including involvement and telepresence. Subsequent research efforts have supported these propositions (Hoffman & Novak 2009) by demonstrating that various forms of involvement, including situational (Huang 2006) and product involvement (Mathwick & Rigdon 2004) facilitate flow. Luna, Peracchio and de Juan (2003) support the importance of telepresence, by demonstrating that website interactivity, an underlying aspect of telepresence, facilitates flow.

The most well-established antecedent to flow is providing a balance between skills and task-demands, in particular within tasks that are highly challenging. Flow happens most often when someone is engaged with a task that challenges them just enough that they can perform well, but requires their full attention (Keller & Bless 2008). Relative to tasks where skillsets exceed the demands of the task, or do not meet the demands of the task, flow happens when people are challenged just enough (Moller, Meier & Wall 2010). This is based on the original channel-model of flow, which suggests that when skills exceed the demands of the task one

experiences boredom and that when skills do not meet task demands one experiences anxiety and worry, both of which will restrict flow (Csikszentmihalyi 1975).

We seek to advance the literature by testing the underlying assumption of flow theory that the antecedents of flow will be the same for all variants (i.e. *microflow* and *deepflow*). In particular, we focus on the role of the most common antecedent to flow- task difficulty. We offer the following mediational predictions consistent with flow theory and test it across several different *microflow* contexts. While the various flow states have the same fundamental experiences, it can be difficult to reliably compare *microflow* and *deepflow* given the inherent differences in the tasks which elicit them. Any potential differences that are found between the two are likely to be subject to confounds related to the specific task itself, given that *microflow* and *deepflow* are by definition elicited by tasks of varying complexity, duration, and intensity. Given these limitations, in this research we focus on contexts that would not be considered *deepflow*, but rather fall closer towards *microflow* on the continuum of complexity and duration (e.g. games, puzzles) and test flow theory within them.

Hypothesis 1a: relative to a game of moderate difficulty, a game that is too easy will induce boredom and thwart flow

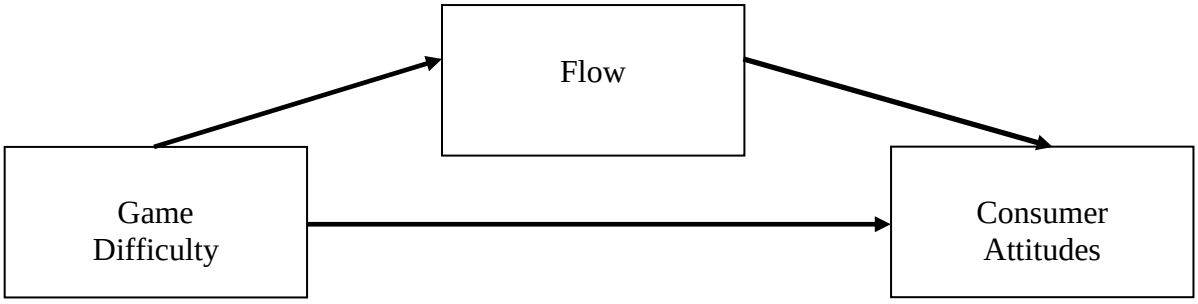
Hypothesis 1b: relative to a game of moderate difficulty, a game that is too difficult will induce worry and thwart flow

Despite being less complex and relatively shorter in duration compared to *deepflow*, we still expect *microflow* experiences to elicit positive consumer attitudes given the fact that they still possess the characteristic flow experiences. Flow has been demonstrated to be a critical

factor of enjoyment and consumer attitudes in many marketing contexts that would fall in the middle range from *deepflow* to *microflow*, such as searching for information online (Mathwick & Ridgon 2004). The positive influence of flow has been supported in marketing contexts, suggesting that flow is a mediator of many positive consumer-related outcomes (Siemens, Smith, Fisher, Thyroff, & Killian 2015). We expect *microflow* to also mediate the relationship between the challenge of a task and subsequent attitudes towards that task.

Hypothesis 2: flow will mediate the relationship between task difficulty and consumer attitudes.

FIGURE- Flow Mediation Model



While the developed hypotheses suggest relationships with flow based on the extant thought of flow as a unidimensional construct, our research recognizes that evidence exists that flow is comprised of multiple dimensions. Early conceptualizations of flow either considered the nine characteristics as distinct, or as part of a unidimensional construct (e.g. Jackson & Marsh 1996; Jackson & Eklund 2004). Flow, as explained above following the four-channel model, is

most often conceptualized as a match of skills with task demands (Csikszentmihalyi 2000). However, evidence suggests that these approaches do not properly characterize flow (Vlachopoulus, Karageorghis & Terry 2000), and that flow is multi-dimensional (Moneta 2012). Recent work has suggested that the nine components are not distinct, but are rather the result of fewer underlying psychological processes (Dietrich 2004).

It is suggested that the nine characteristics of flow can be grouped into two psychological processes (Engeser 2012b). The first is related to a continuous progression in an experience, epitomized by feelings of control and effortlessness. This is reminiscent of Csikszentmihalyi's (2000) description of flow as having order in one's thoughts, called psychic 'negentropy'. The second component under this conceptualization is related to sustaining concentration on a task, epitomized by losing track of time (Rheinberg, Vollmeyer & Engeser 2003). Given the limitations of attentional resources, fully attending to a task will result in that task becoming the sum of one's awareness and will not allow the processing of concepts beyond the task like the self-concept or time (Dietrich 2003; 2004).

We suggest that exploring relationships with flow as a unidimensional construct, whether it be antecedents or outcomes related to consumer attitudes, may be limiting our ability to inform future research. That is because flow has multiple dimensions, which may interact differently with other variables. Although we will test the aforementioned hypotheses which treat flow as unidimensional, we also seek to understand if the dimensions of flow have nuanced relationships with task difficulty and consumer attitudes, which has not yet been done. Since the two dimensions have been proposed but not tested individually, we do not make any specific hypotheses related to them.

Experimental Studies

Study 1

First, we seek to provide initial support for Hypothesis 1a that a moderate level of difficulty will be superior to an easy level with regards to eliciting flow, because the easy level would give rise to boredom (Csikszentmihalyi 1975). Tetris is commonly used in flow research that follows the manipulation paradigm, so we used that as our flow-inducing task (e.g. Moller, Meier & Wall 2010). At the same time, we sought to understand whether the dimensions of *flow* had nuanced relationships with the difficulty of the task.

Pretest

First, we had to determine the appropriate levels of difficulty for our target population given the goals of Study 1 required a moderate difficulty level that would challenge the participants but that they could master, as well as a difficulty level that was a bit too easy for participants. Participants (84 undergraduate students, M_{age} = 20.02, 55.3% male) were randomly assigned to play one of two chosen difficulty levels of Tetris (i.e. moderate- level 5, easy- level 1). After playing Tetris, participants were asked to rate their agreement with the statement "I felt just the right amount of challenge from the game" with 1 = not at all, 7 = very much so. An independent sample t-test between the two groups was significant, such that those in the moderate difficulty condition felt a more appropriate level of challenge (M= 5.07, SD= 1.39) than those in the easy condition (M= 3.51, SD= 1.98, t(83)= 4.18, $p < .001$).

Main Study

Participants (N = 123 undergraduate students, M_{age}= 20.04, 58.5% male) were randomly assigned to play Tetris at one of the two pretested difficulty levels. Following the channel-model of flow (Csikszentmihalyi 1975; Lambert, Chapman & Lurie 2013), the moderate difficulty setting (level 5) was challenging but appropriate for our participant groups' abilities compared to the easy setting (level 1). This created a 2 cell (difficulty: moderate vs. easy) between-participants design. Participants played for approximately 10 minutes and then completed the questionnaire with the dependent measures and demographics.

Measures

We assessed our manipulation of difficulty by asking participants for perceptions of the game difficulty relative to their skills. We used three measures (α = .93) "Was the Tetris game you played" (1= too easy for you, 4= just right, 7= too hard for you), (1= too slow for you, 4= just right, 7= too fast for you) and (1= not challenging enough, 4= just right, 7= too challenging). Flow was measured using the flow short scale, consisting of ten items (a = .883) rated on 7-point Likert scales from 1=not at all, to 7= very much so (Engeser & Rheinberg 2008). For subsequent analyses related to the two dimensions of flow, the items were broken up. The first dimension is related to control and efficiency and is measured using six items (α = .893) including "my thoughts seemed to happen naturally and on their own", and "I felt like I had everything under control". The second dimension is related to sustained concentration and is measured using four items (α = .753) including "I lost track of time" and "I was totally absorbed". We also sought to demonstrate that those in the easy condition would be relatively bored, which should underlie a decrease in flow (Csikszentmihalyi 1975). We measured this with two items "was the Tetris game you played boring?" and was the Tetris game you played exciting?" (reverse coded, r =

.67). We also captured measures that are not reported but were included to be consistent with the cover story and for exploratory purposes in this and all studies.

Results

We first checked the success of the difficulty manipulations by running an independent samples t-test between the two conditions on perceptions of difficulty relative to their skillsets. A successful manipulation would not only show that those in the easy condition perceived the game to be easier than those in the moderate condition, but that the average in the moderate condition would be around four (which is the value on our 7-point scale corresponding to a perfect balance of challenge and skills). The results revealed that those in the easy condition perceived the task to be too easy for their ability (M_{easy}= 3.24, SD= 1.29) relative to those in the moderate difficulty condition ($M_{moderate}$= 4.11, SD= 1.21, t(121)= 3.86, $p < .001$) who perceived an almost perfect balance of skills with the challenges of the task.

We set out to determine the influence of game difficulty on the two sub-dimensions of flow using independent sample t-tests. The results on the dimension related to control and fluent thoughts were statistically significant: those in the easy condition perceived more control and fluent progress (M_{easy}= 5.55, SD= 1.31) than those in moderate difficulty condition ($M_{moderate}$= 4.92, SD= 1.31, t(121)= 2.66, $p = .009$, $d = .48$). However, the difference for the concentration dimension of flow was not significant (M_{easy}= 4.71, SD= 1.43, $M_{moderate}$= 4.95, SD= 1.29, t(121) = -.97, $p = .334$) but those in the relatively harder condition had directionally higher ratings.

In order to test Hypothesis 1a, we first tested whether those in the easy condition were more bored using an independent sample t-test. However, the results revealed that those in the easy condition were not more bored than those in the medium condition (M_{easy}= 3.78, SD= .47, $M_{moderate}$= 3.83, SD= .63, t(121) = .52, p = .61). Mediation results also revealed that contrary to the assumptions of flow theory, the easy task did not increase boredom [B = -.0520 S.E. = .1007, 95% C.I. = -.2513, .1474] and did not reduce flow overall through boredom, as evidenced by a non-significant indirect effect [B = .0229 S.E. = .0462, 95% C.I. = -.0742, .1161]. Together, these results do not support Hypothesis 1a and flow theory, suggesting that *microflow* has nuanced antecedents with regards to task difficulty.

Discussion

The results of Study 1 provide an interesting contrast to flow theory and support against Hypothesis 1a, by demonstrating that those in the easy condition actually had a stronger flow experience than those playing the medium difficulty condition. Moreover, the results demonstrate that the two dimensions of flow have nuanced relationships with other variables, in particular, the difficulty of the task. Exploring the relationship between difficulty and the two dimensions of flow revealed that the easier game increased feelings of control and fluent thoughts, while experiencing no significant difference in the flow dimension related to concentration, or feelings of boredom. It is important to note that those in the moderate condition perceived an appropriate amount of challenge, while those in the easy condition thought it was a bit too easy for them. In Study 2, we seek to explore these relationships further by making a different adjustment to difficulty - having a game that is too hard, instead of too easy.

Study 2

Study 2 has several goals. The primary goal of Study 2 was to provide support for Hypothesis 1b by demonstrating that a moderately difficult task would elicit stronger *microflow* than a highly difficult task, which would induce feelings of worry. We also sought to support Hypothesis 2, that flow would mediate the relationship between difficulty level and consumer attitudes. We again seek to explore nuanced relationships between the two flow dimensions, in particular with task difficulty and consumer attitudes. Study 2 increases the generalizability of our findings by exploring a different *microflow* context- completing Sudoku puzzles.

Pretest

First, we needed to determine a level of difficulty that would be appropriate (moderate) for our participants' and a level of difficulty that would be too high with regards to Sudoku puzzles. We ran a pretest with 100 undergraduate students (M_{age} = 19.96, 51.5% male). Given the advanced knowledge required to complete a Sudoku puzzle, we wanted only those who knew how to complete a Sudoku puzzle. This gave us confidence that the difficulty level we chose would provide a relatively equal challenge across our participants. We asked participants if they knew how to complete a Sudoku puzzle (yes/no) and sent those who chose "no" to a different study, leaving 66 participants for the pretest.

The remaining participants were randomly assigned to play a moderate or hard Sudoku puzzle (see Appendix for pictures). Participants were given a Sudoku puzzle and a pencil, and given 9 minutes to work on it. When time was up, or participants finished, a research assistant collected their Sudoku puzzles and gave them a questionnaire which featured the flow measure and asked demographic information.

In order to assess the appropriateness of the difficulty level, we counted the number of correct answers and if the puzzle was solved. Those in the moderate difficulty condition got significantly more correct answers ($M_{moderate}$ = 32.71, SD = 8.66), than those in the hard condition ($M_{difficult}$= 10.45, SD = 4.96, t(47.13) = 12.52, $p < .001$). In the moderate difficulty condition, 20/31 (70%) solved the Sudoku, while in the difficult condition, no one solved the puzzle. Together, these results suggest that the moderate condition was challenging, but the majority of people mastered it, while the hard condition was beyond their skillset.

Main Study

Participants were first screened for their knowledge of how to complete a Sudoku puzzle (Meyvis & van Osselaer, 2017). Those who did not know how to complete a Sudoku puzzle were redirected to a different study. Participants (N = 142 undergraduate students, Final N = 85, M_{age} = 19.96, 62.2% male) were assigned to work on a Sudoku puzzle with one of the pretested levels of difficulty, creating the same 2(difficulty: moderate vs. hard) between-participants design as used in the pretest.

Measures

Flow (10-items, a = .799) and its dimensions related to control and efficiency (6-items, α = .893) and sustained concentration (4-items, α = .487) were measured the same way as in Study 1 (Engeser & Rheinberg 2008). We measured attitudes towards the puzzle following the experience using three items (α = .972) on semantic differential scales based on the question – what do you think of Sudoku puzzles? The poles were anchored at 1 and 7 with these descriptions; dislike/like, bad/good, negative/positive. We also wanted to demonstrate that those

in the hard condition experienced more negative emotions related to being nervous as a result of the challenge being too high. To assess this, we used three questions from the PANAS scale (Watson, Clark, & Tellegen 1988), asking participants to what degree they felt nervous/afraid/scared ($\alpha = .858$), with five options on a Likert scale from 1 (not at all) to 5 (extremely). Other variables related to the outcomes of flow were collected in this and subsequent studies that are not reported here.

Results

First, we sought to test Hypothesis 1b, that relative to an appropriate challenge, playing the difficult game would induce worry, which would thwart flow. The results of an independent samples t-test between the conditions on feelings of worry confirmed that the difficult group felt more worried ($M_{moderate}= 1.26$, SD= .37, $M_{hard}= 1.77$, SD= 1.03, $t(82) = 2.97$, $p = .004$). The results of the same analysis on flow also revealed the expected pattern such that those in the moderate condition experienced stronger flow than those in the difficult condition ($M_{moderate}= 4.86$, SD= 1.04, $M_{hard}= 4.22$, SD= 1.09, $t(82) = -2.78$, $p = .007$). To test Hypothesis 1b, that worry mediates the relationship between difficulty and flow, we tested for mediation using PROCESS Model 4 (Hayes 2013). The results revealed a significant indirect effect, supporting Hypothesis 1b [$B = .2281$, S.E. = .1068, 95% C.I. = .0526, .4677].

Next, we sought to provide support for Hypothesis 2 that flow mediates the relationship between the difficulty of the game and consumer attitudes. First, we wanted to establish that those in the moderate condition had more positive attitudes than those who played the difficult Sudoku. The results of an independent samples t-test between conditions on attitudes towards the game were significant such that those who played the moderately difficulty game had more

positive attitudes ($M_{moderate}$= 6.12, SD= 1.06) than those who played the difficult game (M_{hard}= 5.34, SD= 1.72, t(80) = -2.48, p = .016). Results of a mediation analysis using PROCESS Model 4 revealed a significant indirect effect [*B* = .4346 S.E. = .2046, 95% C.I. = .1042, .8949], such that moderate difficulty facilitated flow [*B* = .6610 S.E. = .2340, 95% C.I. = .1954, 1.1266], which mediated an increase in consumer attitudes towards the task [*B* = .6575 S.E. = .1323, 95% C.I. = .3942, .9208], supporting Hypothesis 2.

A residual goal of Study 2 was to explore whether the dimensions of flow had unique relationships with the difficulty of the game and attitudes towards the game. The results of an independent samples t-test between the conditions on the individual flow dimensions supported the findings of Study 1 such that those who played the moderately difficult game experienced the first flow dimension related to control and fluent thoughts more strongly (M= 5.36, SD= 1.29) than those in the hard condition (M= 4.01, SD= 1.33, t(82)= 4.72, p < .001, d = 1.03). The results related to the concentration dimension also replicated Study 1, as they were directionally the opposite but not statistically significant ($M_{moderate}$= 4.11, SD= 1.30, M_{hard}= 4.52, SD= 1.06, t(82) = -1.60, p = .11).

In order to determine the relationships between the dimensions of flow and consumer attitudes as predicted in H2, we entered both dimensions of flow as parallel mediators of the relationship between game difficulty and consumer attitudes using PROCESS Model 4. The results suggested that only the dimension related to fluency and control mediated the relationship [*B* = .6494 S.E. = .2417, 95% C.I. = .2514, 1.1934], with the dimension related to concentration producing an insignificant indirect effect [*B* = -.0580 S.E. = .0867, 95% C.I. = -.2960, .0451] and an insignificant relationship with attitudes [*B* = .1488 S.E. = .1274, 95% C.I. = -.1049, .4024].

Discussion

The results of Study 2 provide support for Hypothesis 1b that relative to a moderate level of challenge, a difficult game reduced *microflow*. We also provided support for Hypothesis 2 by demonstrating that flow mediated the relationship between game difficulty and consumer attitudes. The results also support and advance those of Study 1 by demonstrating that the dimensions of flow have nuanced relationships with task difficulty and consumer attitudes, respectively. Relative to a high level of difficulty, providing a moderate difficulty level only directly increased the relative strength of the flow experiences related to control and fluent thoughts. With regards to consumer attitudes, only the dimension related to control and fluency mediated the relationship between difficulty level and consumer attitudes. While the reliability of the flow dimension related to concentration was low in this study, given its acceptable level of reliability in Study 1, we suggest that this finding is an anomaly that we will test again in Study 3. With regards to results, we demonstrate the same relationship between the concentration dimension and task difficulty as Study 1, which reduces concerns related to reliability. However, the concentration dimension fails to mediate consumer attitudes, which may in part be attributed to low reliability. We test these relationships again in Study 3 to mitigate these concerns. To this point the results suggest that providing relatively less challenge in the same task will enhance flow experiences by promoting feelings of control and fluent thoughts. We sought to demonstrate that there is a boundary to this relationship in Study 3, because engaging with a task that is too easy will only work for a limited amount of time before one loses concentration.

Study 3

To this point we have shown that making a game easier will increase perceptions of fluent progress without significantly limiting concentration, subsequently enhancing flow. However, we suggest that there is a boundary such that if a task is made too easy, we will observe the results suggested by flow theory and Hypothesis 1a after a relatively short amount of time. If a task is far below one's skillset, flow experiences related to control and fluent thoughts will be high as we have shown, but the dimension related to concentration will decrease rapidly as people become disengaged with the task over time (Cskiszentmihalyi 1975).

The primary goal of Study 3 is to demonstrate the relationship between the difficulty of the task and flow is moderated by time. To demonstrate this, in Study 3 we manipulate time in addition to difficulty. We also seek to provide additional support for Hypothesis 2 that flow will mediate an increase in consumer attitudes. Study 3 also increases the generalizability of our findings by using a different game than the previous two studies- a find-the-differences puzzle. In this type of game there is clear feedback as to how you are doing, as you count the differences between the puzzles which is an important antecedent to both flow and effective game design (Eppmann, Bekk, & Klein 2018).

Method

Participants (N=127 undergraduate students, M_{age} = 20.28, 58.7% male) were asked to work on one of two find-the-difference puzzles (see the Appendix for the puzzles). In order to vary the difficulty in the puzzles, we used the same puzzle in both conditions but simply made one smaller, making it more difficult to process and ultimately find the differences (Labroo, Dhar & Schwarz 2008; Song & Schwarz 2008). Participants either worked on the puzzle for 20 seconds or 60 seconds in order to demonstrate the rapid decrease in flow's concentration

dimension. These conditions resulted in a 2(puzzle difficulty: easy vs. medium) X 2(time: 20 seconds vs. 60 seconds) between participants design.

Measures

With regards to the manipulation of time, there was an embedded timer that moved participants forward to the next page to ensure a successful manipulation. We manipulated the perceived level of challenge by following the literature suggesting that decreasing the size of something that needs to be processed will increase perceived difficulty (Schwarz, 2004). We used the item "I felt just the right amount of challenge" to assess the manipulation of difficulty. Flow was measured in the same way as in previous studies (10-items, a = .833), with the control (6-items, α = .909) and concentration (4-items, α = .892) subscales. We assessed evaluations of the game using three measures (α = .944) asking participants "was the game you just played…" enjoyable/interesting/entertaining, each evaluated on 7-point Likert scales anchored at 1=not at all, 7= very much so.

Results

To assess the effectiveness of our manipulation of puzzle size to influence the perceived level of challenge we conducted a 2(puzzle difficulty) x 2(time) ANOVA. The results revealed a significant interaction ($F(1, 122) = 4.67$, $p = .033$). Looking at the focal comparison for those who played for only 20 seconds showed no difference in the perceived level of challenge. However, the larger (easier) puzzle led to perceptions that it was too easy with those who played

for 60 seconds feeling as though it was too easy (M_{easy} = 3.55) relative to those who had the smaller puzzle (M_{medium} = 4.52, F (1, 122) = 3.99, p = .048). The larger (easier) puzzle was perceived to be significantly easier over time, with those who worked on it for 60 seconds perceiving it to be significantly easier (M = 3.25) than those who worked on it for 20 seconds (M = 4.52, F (1, 122) = 6.95, p = .009). We suggest that this is a successful manipulation while demonstrating that some time is required to adjust to the level of difficulty.

First, we wanted to demonstrate that those with the easy puzzle experienced a moderate level of concentration, which dissipated quickly. To do so, we ran a 2(puzzle difficulty) x 2(time) ANOVA on the concentration dimension. The results revealed only a significant interaction (F(1, 122) = 6.15, p = .014). Decomposing the interaction, the focal comparison of the 60-second conditions revealed that those who had the easier puzzle had significantly lower concentration (M_{Easy} = 3.36) than those who had the medium difficulty puzzle (M_{Medium} = 4.47, F(1, 122) = 6.71, p = .001). The level of concentration did not differ across conditions when they were only playing for 20 seconds (F(1, 122) = .819, p = .367; M_{Easy} = 3.73, M_{Medium} = 4.12). Further analysis of the direct effects demonstrated that concentration increased marginally over time for those playing a moderately difficult puzzle ($M_{20seconds}$ = 3.73, $M_{60seconds}$ = 4.47, F(1, 122) = 2.96, p = .088). However, it had the opposite effect for those playing the easier puzzle, as concentration marginally decreased over time ($M_{20seconds}$ = 4.12, $M_{60seconds}$ = 3.36, F(1, 122) = 3.20, p = .076).

We ran the same 2(puzzle difficulty) x 2(time) ANOVA on the dimension related to control and fluent thoughts. The results revealed a marginally significant interaction (F(1, 122) = 3.28, p = .073) and a main effect of time (F(1, 122) = 8.44, p = .004). An analysis of the simple effects demonstrate that as expected, the interaction is driven by a significant increase in fluent

progress over time in the medium difficulty condition ($M_{20seconds}$ = 4.32, $M_{60seconds}$ = 5.39, F(1, 122) = 11.12, p = .001), and a lack of significant increase over time in the easy condition ($M_{20seconds}$ = 5.03, $M_{60seconds}$ = 5.28, F(1, 122) = .60, p = .440). Further analysis reveals that as expected those working on the puzzle for 20 seconds had a higher degree of fluent progress when working on the easier puzzle (M_{Easy} = 5.03, M_{Medium} = 4.32, F(1, 122) = 4.96, p = .028). Importantly, there was no difference across the groups when working on the puzzle for 60 seconds (M_{Easy} = 5.28, M_{Medium} = 5.39, F(1, 122) = .12, p = .727), since the group working on the medium puzzle significantly increased the fluency of their thoughts.

In order to test Hypothesis 2, that flow mediates the relationship between difficulty and consumer attitudes, we ran a 2x2 ANOVA on game attitudes, which revealed a significant interaction (F(1, 122)= 4.80, p= .03). A comparison of those who played the moderately difficult game revealed that those who played for longer had more positive attitudes towards the game (M= 4.46) than those who played for the shorter amount of time (M= 3.58, F(1, 122)= 4.06, p= .046). Comparing with the results above, this same contrast was associated with an increase in the dimension related to control and fluent thoughts. A planned contrast for those who played for longer revealed that those who had the moderately difficult game had a more positive attitude (M= 4.46) than those who played the easy game (M= 3.54, F(1, 122)= 4.42, p= .037). Comparing this with the results above, this same contrast was associated with a decrease in the flow dimension related to concentration.

Given the 2(difficulty) x 2(time) design of Study 3, we tested for mediation using PROCESS Model 7, with time moderating the relationship between difficulty level and flow. In the same way as in Study 1, we demonstrated that flow mediated the relationship between game difficulty and product attitudes, but only in the short time condition [B = -.4914 S.E. = .2267,

95% C.I. = -.9515, -.0642], not the long-time condition [*B* = .4359 S.E. = .2599, 95% C.I. = -.0603, .9632]. We were able to mitigate the mediating effect of flow by having participants play an easy game for too long. Looking at the relationships between the individual dimensions of flow and consumer attitudes reveals a similar pattern, such that the dimension related to fluency mediates consumer attitudes in the short condition [*B* = -.2883 S.E. = .1577, 95% C.I. = -.6416, -.0325], but not the long condition [*B* = .0459 S.E. = .1349, 95% C.I. = -.2338, .3240]. On the other hand, the dimension related to concentration mediates consumer attitudes in the long-time condition [*B* = .6002 S.E. = .2658, 95% C.I. = .1116, 1.1640], but not the short one [*B* = -.2064 S.E. = .2293, 95% C.I. = -.6907, .2285], driven by the reduction of concentration in the longer time play condition.

Discussion

Study 3 demonstrates that a level of difficulty below one's abilities reduces flow over time. Importantly, we introduced time to be able to show this relationship. In the very short time period flow was strongest in the easy condition, but after a small amount of time the dimension related to concentration, and ultimately flow, was reduced quickly. It is important to note however, that the dimension related to control and fluency was not reduced over time. These results demonstrate the importance of time with regards to understanding the nuances of flow states and how to facilitate and sustain them.

The results of Study 3 also provide support for Hypothesis 2 that flow mediates consumer attitudes, while demonstrating that this relationship can be thwarted over time when a task is too easy. We provide additional support that the control dimension of flow mediates consumer attitudes, while also providing evidence that the concentration dimension can mediate consumer

attitudes in an easy task. The respective dimensions mediated consumer attitudes in the time conditions where they were altered most, the dimension related to fluency mediating in the early conditions, which is when it increased most, and the dimension related to concentration mediating in the late conditions, which is when it was reduced.

General Discussion

This research advances our knowledge of flow by exploring relatively less complex, shorter flow states, called *microflow* and their underlying dimensionality. We explore how to facilitate them and the outcomes they have on consumer attitudes. With regards to facilitating *microflow*, we advance flow theory by demonstrating that it is not a match of skills with task demands that is most conducive to *microflow*, but rather it is when one's skills exceed the demands of the task. This result is driven by the fact that the two dimensions within *microflow* have different relationships with task difficulty.

Incremental increases in the difficulty of a game thwart the first dimension of flow related to control and fluent thoughts, but foster the flow dimension related to concentration. An increase in difficulty demands attention and resources, which sustain concentration, and will ironically limit the amount of forward progress and the subsequent experiences related to control and fluency that comprise the first dimension of flow. The opposite is the case when making a task incrementally easier. While it may appear optimal to provide games that are as easy as possible, we caution that making an experience too easy comes at a detriment to concentration and ultimately flow over time. Skill just exceeding the challenge of the task is optimal in very short tasks, but the dimension related to concentration, and ultimately flow diminishes quickly (Study 3).

Our results also provide insight into the outcomes of flow related to consumer attitudes. We demonstrate that both flow dimensions can mediate consumer attitudes, but that their relative importance depends on the difficulty of the task. In Study 2 we showed that only the dimension related to control and fluent thoughts mediated consumer attitudes. We suggest that this is due to the relative difference in that dimension when comparing a moderate and difficult task. In Study 3 we show that both dimensions mediate consumer attitudes, with the dimension related to fluency mediating only in the short condition, which was when fluency was the dimension that changed (increased), and the dimension related to concentration mediating in the long condition, when concentration was the dimension that changed (reduced). The takeaway is that facilitating the dimensions of flow can be done separately and that their relative importance related to marketing outcomes differs. This is related to perhaps the strongest contribution of our findings, which is facilitating future work on flow in marketing.

Our results related to the nuanced relationships between task difficulty and the flow dimensions open the door to demonstrate other ways to facilitate flow. For example, a critical aspect of the first dimension of flow is a sense of control and smooth/ fluent thoughts. Research has demonstrated that many aspects that can be used in marketing materials can be manipulated to influence perceptions of fluency. A noteworthy marketing-relevant factor that stands out for its ability to influence these perceptions of fluency is aesthetics (Hagtvedt & Patrick 2014). Aspects related to aesthetics that could influence the perceived fluency include visual and auditory aspects of an experience such as the color, size and font of words, background colors, sounds, and the duration of exposure to information (Reber, Winkielman & Schwarz, 1998).

The second dimension of flow is epitomized by sustained concentration and the experience of losing track of time. This appears to be driven by requiring sustained attention

which can be thwarted by making a task too easy. With a better understanding of what this dimension is, we can derive other ways to foster it. Although we demonstrate that difficulty is one way to foster it, there are many other ways to demand and hold attentional resources. Importantly, there may be ways that increase sustained concentration without having a detrimental effect on fluency, making them a better facilitator of flow than difficulty. We suggest that narratives may have a powerful ability to do this.

Narratives are often used in a marketing context (Solja, Liljander, & Soderland 2018) and their effectiveness is well-documented (Pera & Viglia 2016). The experience of becoming absorbed in a story is referred to as narrative transportation, and is defined as a process through which a person's attentional system becomes narrowed and concentrated on the events occurring in the narrative (Green & Brock 2000). Narrative transportation is a pleasurable experience in which a reader feels 'transported' to the world of the story, which the majority of their senses are reacting to in favor of their physical world (for a discussion of how transportation is different from flow, see Van laer et al. 2013).

Our results also have practical implications for the way we think about and study flow. Given the counterintuitive findings that we support related to the optimal task characteristics to promote flow, we articulate why we find these differences. There is a critical difference between the context that we are studying and the context in which flow was first studied. It is a difference in the nature of flow states, in particular the complexity and the subsequent amount of time the task takes, a difference that was originally recognized by Csikszentmihalyi (1975) but has been largely overlooked in the literature. Flow states can be sustained in complex activities for a long period of time, suggesting *deepflow* states. However, flow is more commonly experienced briefly, as would be the case in most consumption contexts.

It makes sense that the original flow theory, which is derived from relatively long *deepflow* states, suggests to push the upper limits of one's abilities. As we demonstrate in Study 3, the longer attention must be sustained, the harder the task can be. In any given task, the longer it is, the more optimal it will be to provide a match of skills with task demands that shade on the upper edge of ability so that fluency is still likely, but that concentration sustains over the longer duration. However, in relatively short, single interactions as is the case with many consumption contexts, attention does not need to be sustained for long, so it seems optimal to have a player's skills exceed the demands to promote feelings of control and fluency.

By demonstrating that *microflow* experiences have different antecedents than *deepflow*, in particular the balance of challenge and skill, our results provide insights for subsequent research and marketing practice related to flow. With regards to research, when studying flow one must recognize the complexity of the task and the subsequent duration and intensity it will elicit to determine whether the flow state would be closer to *microflow* or *deepflow*. Our findings also have implications for marketing practitioners in terms of eliciting flow. Perhaps the best example of eliciting *microflow* in shorter, less complex tasks is that of 'addicting' cell-phone video games (e.g. Bejeweled) which seem to have captured the essence of our findings, as they allow for a higher degree of fluency by ensuring that skills exceed the demands of the task. As a result, consumers become fully absorbed in a shorter amount of time, leading to enjoyment. As consumers learn and develop their skills through progress, well-designed games get incrementally harder, to maintain the slight surplus of skill and hold attention.

The findings of Study 3 also demonstrate the importance of studying flow at specific points in time as the dimensions change over the duration of any experience. The relationship between the two dimensions of flow and how they interact with each other would be a fruitful

area of study to help understand the underlying process related to sustaining flow and subsequent enjoyment in a wide variety of consumption experiences. Moreover, future research should explore the unique roles of each dimension of flow related to other marketing-related outcomes. Perhaps when it comes to actual purchase or WOM, one dimension is more important that the other. Moreover, research should be done related to the physiology of flow and in particular, its two dimensions. This is important because perhaps the two dimensions of flow have unique physiological markers. Overall, we hope that our research provides a springboard for future research related to flow and enjoyable consumption experiences in general.

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