December 1998

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Introduction

Researchers have defined microcomputer playfulness (MCP) as a situation-specific individual characteristic that represents a type of cognitive playfulness [46]. Further, MCP describes the tendency to interact spontaneously, inventively, and imaginatively with computers. Studies [46] have suggested that MCP should be measured as both a trait and a state variable. The issue over whether MCP is a trait, a state, or a combination of the two, parallels the disagreement in social and applied psychology among situationists and trait theorists. To clarify this and other issues, we synthesize the literature from psychology and human resource management (HRM) to develop a theory of MCP using multiple constructs.

Trait-State Theory and the Big Five

Situationists typically believe that behavior patterns depend on the situation and show little stability over time. They argue that the anxiety state, probably the most studied state-trait variable ([42], [43]), can be triggered by a temporary reaction to a stressful environment (e.g., taking a test) in individuals who do not otherwise exhibit long-term behaviors associated with the trait of anxiety.

Trait theorists, on the other hand, believe that traits result in consistent behavior patterns over time. Trait theorists believe that prediction can be improved through aggregation of data and other means, regardless of the situation. Much research has shown evidence of the stability of traits over time ([9], [10], [29], [33]) and the ability of traits to predict important behavioral variables without reference to the situation [6]. This evidence has led to a resolution of the controversy, at least for trait theorists and HRM. Many trait and HRM theorists believe that traits can accurately predict behavior, and that traits show inherent stability over time and across situations. We believe that a distinct set of traits summarizes personality, often termed the Big Five personality traits [15].

Although there have been disagreements on the exact description of the factors of personality, there is widespread agreement on the general nature of the constructs ([6], [10], [15], [33], [38], [39]). The most widely accepted model is the Big Five model. This model consists of five constructs (Extraversion, Agreeableness, Openness to Experience, Emotional Stability, and Conscientiousness), which capture the domain of personality. We suggest that the Big Five traits are antecedents in the theory of MCP, as shown in Figure 1.

Individuals scoring high on Extraversion are outgoing, sociable, talkative, adventurous, active, warm, and ambitious [38]. We predict that high scorers on Extraversion will tend to exhibit qualities associated with the physical and social spontaneity aspects of the trait of playfulness. The physical spontaneity characteristic of playfulness refers to a person who is active while playing [5] and who shows spontaneous physical movement and activity during play [31]. The playfulness research of Lieberman [31] and Barnett [5] suggests that an individual who is adventurous, active, and energetic exhibits the physical spontaneity aspect of the playfulness trait. Since similar qualities are often associated with the trait of Extraversion, we suggest that Extraversion will predict the trait of playfulness. Second, personality research [11] studied the relationship between Jackson's [28] play variable and the Big Five traits and showed a significant correlation between the play variable and the excitement-seeking facet of Extraversion, providing additional support for the proposed link. Extraversion also should predict the social spontaneity portion of playfulness, which includes ease of interacting in groups [31] and responding easily to others [5]. We suggest that an extrovert would be more comfortable in a group setting and should respond easily to others. Moreover, personality research [11] found significant correlations between the play variable and the warmth and gregariousness facets of the Extraversion trait. Thus we hypothesize:

H1: Extraversion is positively related to playfulness.

Qualities associated with Agreeableness include being courteous, flexible, trusting, good-natured, cooperative, forgiving, and tolerant [6]. We suggest that individuals who score high on Agreeableness may also tend to score high on the trait of playfulness. The agreeable person is cooperative and adds cohesiveness to group situations, qualities which are similar to the social spontaneity aspect of playfulness. Further, Barnett's [5] study found a significant correlation between playfulness and the adjective describing a cheerful child, which loads on the Agreeableness factor. Finally, we suggest that this cheerful disposition
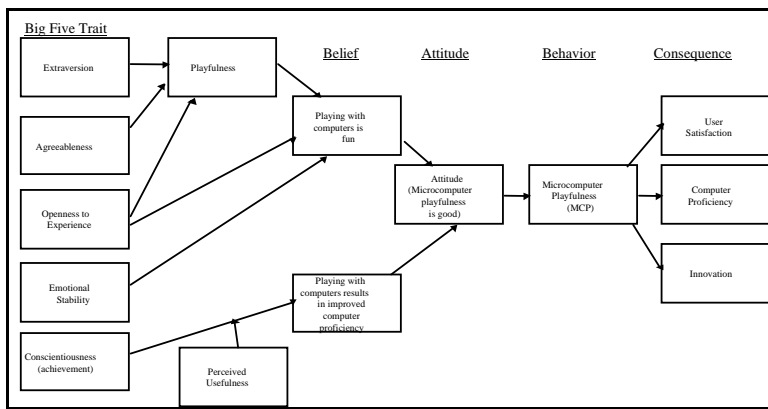
Figure 1. The Theory of Microcomputer Playfulness

may lead an individual to be more tolerant of software nuances and difficulties encountered when working with computers. Thus we hypothesize:

H2:   Agreeableness is positively related to playfulness.

Individuals scoring high on Openness to Experience are imaginative, curious, and original ([6], [38]). Openness to Experience contributes to our model in two manners. First, we predict that persons scoring high on Openness to Experience will more likely exhibit qualities associated with the sense of humor facet of playfulness. Barnett's [5] study showed a significant relationship between the bright, curious, and imaginative child and the sense of humor aspect of playfulness. Second, research also supports the link between Openness to Experience and the cognitive spontaneity aspect of playfulness. Barnett [5] showed a significant correlation between the bright, curious, and imaginative child and the cognitive spontaneity aspect of playfulness. Moreover, personality research [11] showed a significant correlation between the play variable and the fantasy aspect of Openness to Experience. We propose:

H3:   Openness to Experience is positively related to playfulness.

We also predict that Openness to Experience leads to a belief that playing with computers is fun. First, high scorers on this trait tend to have positive experiences towards learning in general [6]. They may be more likely, therefore, to have a belief that playing with computers is fun. Second, those scoring high on Openness to Experience may be more tolerant of ambiguous situations, due to being curious, imaginative, and original. We suggest that these individuals welcome new, unknown, and often ambiguous situations. Tegano's [44] study found significant correlations between ambiguity tolerance and playfulness, supporting our hypothesized relationship:

H4:   Openness to Experience is positively related to the belief that playing with computers is fun.

Individuals scoring low on Emotional Stability are anxious, emotional, and worried [6]. They may be nervous, easily irritated, and characterized as falling apart in times of stress [24]. We propose that high scorers will be unlikely to suffer from computer anxiety. These people will likely have positive experiences in computer interactions and will thus form a belief that playing with computers is fun. Two studies support the proposed link. First, researchers showed a negative relationship between computer anxiety and MCP [46]. Second, researchers [7] showed a negative correlation between cognitive spontaneity and computer anxiety. Thus we propose:

H5:   Emotional Stability is positively related to the belief that playing with computers is fun.

Conscientiousness is associated with individuals who are thorough, responsible, organized, planful, and achievement-oriented [6]. We suggest that conscientious individuals may exhibit MCP because of their belief that playing with computers will result in improved computer proficiency. Conscientious individuals will form this belief based on how useful they perceive MCP to be. Two studies on individuals' motivation to use computers provide support. First, researchers [4] found that usefulness significantly contributed to explaining World Wide Web (WWW) usage by students. The conscientious students who saw the WWW as useful in achieving course goals tended to exhibit MCP. Second, researchers [13] showed how extrinsic motivational factors influenced an individual to perform an activity because it helps achieve desired outcomes that are separate from the activity. Thus:

H6a: Conscientiousness is positively related to the belief that playing with computers results in improved computer proficiency.

H6b: Perceived usefulness moderates the relationship between Conscientiousness and the belief that playing with computers results in improved computer proficiency.

The Theory of Planned Behavior

Ajzen [3] developed the Theory of Planned Behavior (TPB), based on earlier research [18], which discussed relationships between beliefs, attitudes, intentions, and behaviors. This theory attempts to predict and explain human behavior in specific contexts. Using aspects of TPB, we further developed the theory of MCP.

Fishbein & Ajzen [18] defined a belief as a person's knowledge, opinions, and thoughts about an object. Individuals form beliefs by associating an object with certain attributes. These perceptions are primarily descriptive in nature and do not have an affective component. We predict that a person's beliefs about the microcomputer are influenced by certain traits, which cause that person to be more or less predisposed to form a positive attitude regarding microcomputer interactions.

Attitudes are a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object. They represent the addition of affect and evaluation. When forming an attitude, individuals place an object on an evaluative continuum from good to bad.

We incorporate beliefs and attitudes into our model as mediators between the traits and MCP. We suggest that a person forms two beliefs relevant to MCP. First, individuals scoring high on playfulness will tend to form a belief that playing with computers is fun. High levels of the playfulness trait suggest a curious, imaginative, and original individual, who seeks fun and enjoyable situations that will also be stimulating. Thus we hypothesize:

> *H7:* *The trait of playfulness is positively related to the belief that playing with computers is fun.*

Second, conscientious individuals may form a belief that playing results in improved computer proficiency, as previously discussed in hypotheses 6a and 6b. These two beliefs together lead to an attitude towards MCP in general. As a result of these beliefs, individuals have a predisposition to form a positive attitude towards playing with the computer. Therefore, we propose:

> *H8a:* *The belief that playing with computers is fun is positively related to the attitude that MCP is good.*
>
> *H8b:* *The belief that playing with computers results in improved computer proficiency is positively related to the attitude that MCP is good.*

A third key element in TPB is the behavior, or an observed, overt act [18]. In MCP, the behavior is the amount of MCP an individual exhibits, measured with self-reports [46] or other means. We theorize that individuals who form a positive attitude towards MCP will be more likely to exhibit the MCP behavior. We propose:

> *H9:* *The attitude that MCP is good is positively related to the MCP behavior.*

Consequences of Microcomputer Playfulness

We believe that MCP leads to three primary consequences. First, we predict that individuals who exhibit the MCP behavior will tend to have higher user satisfaction in microcomputer interactions than users who do not interact playfully with computers. Numerous previous studies have supported the satisfaction outcome ([12], [32], [35], [41]). Thus we hypothesize:

> *H10:* *MCP is positively related to user satisfaction.*

Second, we theorize that MCP leads to improved computer proficiency. Individuals who exhibit MCP may tend to see computer interactions as a form of play, and Webster, Heian, & Michelman, [45] found that labeling computer training as play positively affects the training outcomes. Perry & Ballou [40] also found effects on learning, when individuals perceived a task as fun. Further, Martocchio & Webster [46] found that MCP is positively related to learning. Therefore, we hypothesize:

> *H11:* *MCP is positively related to computer proficiency.*

Third, we theorize that MCP leads to general individual innovative behavior. We refer to innovative behavior in the context of microcomputer interactions, such as development of Excel macros to simplify tasks. Two studies support this link. First, the MCP instrument [46] uses words such as inventive, original, and experimenting to describe individuals who are likely to exhibit MCP. We contend that these inventive and experimenting qualities are indicative of innovative outcomes. Second, empirical studies of innovation show that the innovative process is complex, messy, and non-linear [27]. The original and experimenting individual, who scores high on MCP, would be likely to exhibit the behavior needed to succeed in such an environment. Thus:

> *H12:* *MCP is positively related to individual innovation.*

Conclusion

This research provides many opportunities for future research. First, researchers should test the theory to verify the results, and correlational analysis would be useful in this regard. Since attitudes form and may change over time, using longitudinal designs or structural equation modeling may be helpful. Second, the impact of the proposed theory on training in the workplace should be investigated. Since playfulness has been linked to training outcomes [46], as well as creativity and innovation ([31], [44]), further understanding of the outcomes of MCP can lead to better training preparation and design. Third, research can more closely examine the relationships between playfulness and creativity and determine if training programs should be designed with more allowances for individual creativity. Finally, we urge researchers to use the theoretical frameworks and constructs in the Big Five traits and TPB to investigate other areas in MIS. Using these models of personality and behavior, managers could more effectively understand relationships between outcomes and employees' traits, beliefs, attitudes, and behaviors.

References

References available upon request from Amy Woszczynski (awoszcz@clemson.edu).