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Unconscious goal pursuit primes attitudes towards technology usage: A virtual reality experiment

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ABSTRACT

Several approaches in technology adoption, such as the Technology Acceptance Model (TAM), ask future users to provide evaluations of technology. Such evaluations are expected to predict actual use behavior. For example, users' evaluations in terms of perceived usefulness and perceived ease of use are considered meaningful indicators of intention to use the technology, and future usage. However, these approaches still show limited reliability and do not consider other critical aspects, such as situated, unconscious goals and the tendency to perceive related affordances. In order to test the hypothesis that technology evaluation may be influenced by unconscious goals, forty participants were split in two groups. The experimental session included two phases. In the first phase, each group explored a virtual environment that primed a specific goal. In the second phase, participants were asked to evaluate the usefulness and the easiness of use of two versions of the same technology (a mobile devices interface). Results showed that each group evaluated as more useful the version of the technology which featured an affordance related to the respective primed goal. Discussion deals with the possible unconscious influences on attitudes towards technology adoption, and provides operative guidelines to account for them in technology adoption research.

1. Introduction

Technology acceptance/adoption has been a fundamental issue for social sciences, cyberpsychology, and Information Systems Management for years. The implementation of new technologies at the level of organizations is an activity exposed to the risk of final limited/null usage by the target population, with potentially enormous consequences in terms of economic losses. For example, a company may be interested in updating its own informatics system, in order to improve work processes and overall productivity. However, its employers may refuse to use the new system and/or struggle to adapt to it. This could result in a waste of time, resources and interventions to promote acceptance, sometimes leading to fail and return to previous technological infrastructures (Legris, Ingham, & Collerette, 2003). For this reason, scholars have proposed many models and theories to explain what factors may explain and *predict* the intention to use (or not to use) a technological innovation, its actual usage, and/or its final adoption (for reviews on the numerous theoretical approaches see (Karahanna, Straub, & Chervany, 1999; Straub, 2009; Venkatesh, Morris, Davis, & Davis, 2003). Similarly, companies often engage in various marketing research activities to understand whether a given technological product or service has or not an appeal for the target consumers. For example, survey research asks users to provide opinions about products and brands, with the aim of predicting final marketplace behavior (Rindfleisch, Malter, Ganesan, & Moorman, 2008).

Many of these practices have in common the general tendency to rely on users/consumers' self-reported evaluations (generally conceptualized as attitudes, beliefs, opinions, or judgments) of some properties of the evaluated technology. The most widespread model explaining technology usage is the Technology Acceptance Model (TAM) (Davis, 1989). Inspired by the Theory of Reasoned Action (Ajzen & Fishbein, 1980) coming from social psychology, the TAM is based on a key assumption: the behavioral intention to use the technology (which is seen as a predictor of the future actual usage) is predicted by the future users' self-reported evaluations of the technology, in terms of perceived usefulness and perceived ease

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of use. For this reason, the variables within the TAM are typically measured using a short, multiple-item questionnaire investigating the above-mentioned variables (Turner, Kitchenham, Brereton, Charters, & Budgen, 2010). Specifically, perceived usefulness can be defined as the extent to which a person (user) believes that using a system enhances his/her performance (Davis, 1989; Saadé & Bahli, 2005). It has a direct effect on intention-to-use the technology. Perceived ease of use is defined as the extent to which a person (user) believes that using the technology will be free of effort (Venkatesh, 2000): as a predictor within the model, it has a direct effect on intention-to-use the technology (i.e., the user is more motivated to use a system that is easy to use) and an indirect effect on intention-to-use the technology via perceived usefulness (i.e., a system that is easy to use is considered more useful) (Davis, Bagozzi, & Warshaw, 1989; Igbaria, Zinatelli, Cragg, & Cavaye, 1997).

In the end, also actual usage is measured, using both self-report questions (e.g., "I have used the technology") and/or, where possible, objective measures of actual usage such as registered number of log ins or medium duration of the system activity. The TAM (or its variants) has been used to evaluate the acceptance of an extraordinary variety of technologies, ranging from text editors (Davis, 1989) to business intranets (Horton, Buck, Waterson, & Clegg, 2001), the web (Feneche, 1998), e-mails (Gefen & Straub, 1997), mobile commerce (Wu & Wang, 2005) and learning (Park, Nam, & Cha, 2012), video games for education (Bourgonjon, Valcke, Soetaert, & Schellens, 2010), SMS advertising (Muk & Chung, 2015), eHealth systems (Pai & Huang, 2011), and a variety of web-based services (Edmunds, Thorpe, & Conole, 2012; Mah, Hissan, & Ch'ng, 2011).

According to systematic reviews and meta-analyses (King & He, 2006; Turner et al., 2010), the variables within the TAM usually show effective yet limited explanatory power towards behavioral intention to use the technology, and actual usage. The predictors of the original TAM are characterized by different reliability. Perceived usefulness is considered the most solid predictor of TAM (Venkatesh, Tong, & Xu, 2012), while perceived ease of use sometimes leads to controversial results (Hu, Chau, Liu Sheng, & Tam, 1999; Keil, Beranek, & Konsynski, 1995; Subramanian, 1994). Even the most recent models explaining technology acceptance, such as the UTAUT2 which extends the TAM with contextual and affective variables, have shown to explain around 74% of the variance of behavioral intention to use, and 56% of the variance of actual usage (Venkatesh et al., 2012). These limits point out that self-reported opinions may not always be meaningful indicators of intentions and behavior (Bagozzi, 2007; Chuttur, 2009; Kuo & Young, 2008). From a psychological point of view, people not always do what they said they would have done: this is the problem with the *behavioral intention to use – actual usage* link assumed by these models. Indeed, a user may respond positively to a general, abstract question about his/her own intention to do something in the future; but then, when it comes to actual behavior, the situation the user is in may feature contextual constrains, competing intentions, social influences, emotions and habits the user had not taken into account at the time of the question, and so finally behave differently.

Indeed, already in the original TAM perceived usefulness and perceived ease of use were not conceived as coming "out of nowhere". On the contrary, TAM theorists postulated that "external variables" influence the user's responses. According to Legris and colleagues (Legris et al., 2003) external variables, along with the different usage measures, are the less studied aspect of TAM. In accordance with other studies on the topic (Burton-Jones & Hubona, 2006), their review pointed out how numerous studies applying TAM did not consider possible external variables; differently, those that did, considered a huge variety of possible external variables influencing evaluations including gender and age, previous experience with the system, social influence, output quality, transitional support, computer self-efficacy just to name some.

In any case, the user's opinion about the technology (being it focused on usefulness, ease of use, or other properties) is of uncertain origin, and consequently of limited reliability. Since the user is expected to (maybe) use the technology in the future, he/she cannot rely on personal experience of the technology itself. How is the user supposed to answer a question like: "Do you find the technology useful?" Where do the user's opinions come from? The user can consider previous experience with similar technologies, or social influence/hearsays contents; of course, the user can also be influenced by self-presentation bias, responding the way he/she thinks the interviewer expects.

In this sense, it is possible to say that the TAM and TAM-inspired models are based on an un-tested assumption, that is, user's opinions can be considered reliable indicators of his/her future behavior. On the contrary, in the present contribution, we argue that technology evaluations can be influenced by *situated* variables. Indeed, users responses about the usefulness and ease of use of a new technology may be influenced by (1) situated goals that are currently guiding their own behavior, and (2) the consequential disposition to perceive or not selected affordances in the technology. Our objective is to test this specific hypothesis, by implementing a dedicated experimental approach.

1.1. Unconscious goal pursuit and the perception of affordances

Imagine that two interviewees are asked to evaluate usefulness and easiness of use of a new technology to be implemented in their workplace, say, a new telecommunication system. Before asking the questions, the interviewer shows them the functionalities of the new technology. Despite their responses will be registered and analyzed as equally important and of general interest, the two individuals may perceive the technology differently, depending on the personal goals they are pursuing at the moment. For example, one of the two interviewees is actually planning to get in contact with other people later that day, so that a goal related to the functions of the evaluated technology (communication) is already activated to guide his own behavior. Therefore, he may perceive the technology as more desirable, useful, interesting, in that the technology features affordances related to his own situated goals. Actually, according to literature, such a phenomenon may happen even outside of the interviewee's conscious awareness.

Indeed, recent research demonstrated that humans may pursue goals outside of conscious voluntariness (Custers & Aarts, 2010). Goals can be activated by environmental cues, this way promoting goal-directed behavior outside of conscious awareness (Custers, Maas, Wildenbeest, & Aarts, 2008). In other words, the environment can motivate people to reach their goals in an automatic fashion. Specifically, multiple experiments have explored the effect of unconscious goal priming on subsequent performance. For example (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001), participants have been exposed to words related to the goal of obtaining a high performance (e.g., win, compete, succeed…), and then they performed significantly better in another word-completing puzzle task than a control group that had been exposed to random words. Another experiment showed that participants exposed to words related to the goal to cooperate, then replenished a commonly held resource more readily than the control group exposed to random words. Such unconscious goals can even be primed by environmental features. For example, participants have been shown to become more competitive when seeing a leather briefcase (an object typically associated with the business world and to competitive contexts) placed on the desk