The University of Texas at Austin
Center for Identity

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Dawna I. Ballard
Mathew S. McGlone
Brenda L. Berkelaar
Maxim Baryshevtsev
Laura Brown

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Convenience vs. Security for Mobile Wallet Use

Dawna I. Ballard Matthew S. McGlone Brenda L. Berkelaar Maxim Baryshevtsev Laura Brown
Department of Communication Studies and The Center for Identity, The University of Texas at Austin

Industry professionals and scholars recognize that consumers make privacy decisions, such as the desirability of mobile wallet use, through weighing a variety of competing material and social factors. One of the classic reflections of this tension is the frequently cited "convenience-security" factor (Kim & Park, 2012). While the meaning of security is well-defined—if how to achieve it is an ever-changing issue and open to hot debate—there have been almost no attempts to define convenience. Various types of service convenience have been identified in marketing related to buying or using a service (Berry, Seiders, & Grewal, 2002), but this is domain specific and focuses on different types of service convenience without defining its fundamental attributes. This absence poses problems for an entire literature and industry that references an issue as if there is any understanding about what we mean.

Additionally, the sociomateriality of the convenience-security dilemma often goes unaddressed. While both social factors and material features are regularly considered as predictors of adoption patterns, their constitutive entanglement has not been considered in the consumer privacy and security literature. A sociomaterial analysis considers the practices that bind the human and the technological in relation to the other (Orlikowski, 2007). For these reasons, we take a spatiotemporal perspective on convenience and mobile wallet use patterns. Specifically, we seek to examine the extent to which consumers' attitudes and behaviors regarding time and space are predictive of their attitudes and behaviors regarding the spatiotemporal affordances of mobile wallet applications.

Below, to offer clarity to the conversation, we offer a working definition of convenience (currently being further tested through qualitative research) and consider it in relation to the underlying social and material features of mobile payment. In the remainder of the paper, we report on the design, sample, and initial results of a mobile wallet use study that considers these features together.

Convenience, Mobile Communication Technology and Time-Space Research

Castells and colleagues (2000; Castells, Fernadez-Ardevol, Qui, & Sey, 2007) theorize about how societal shifts associated with mobile communication technologies find us collectively experiencing "space" that is not defined by place, but by a given network of relationships (what Castells calls a *space of flows*), and "time" that is not defined by a clock, but through constant interaction that saturates all moments with activity (called a *timeless time*). Indeed, Castells and colleagues argue that these new communication processes are key to the emergence of what he calls a *network society*, owed to the fact that: "Time and space are the fundamental, material dimensions of human existence. Thus, they are the most direct expression of social structure and structural change." (Castells et al., 2007, p. 171).

While Castells' work offers a heuristic perspective on the sociological processes underlying mobile communication, current research on mobile payment adoption has failed to consider how this lens—one of the few brought to bear on mobile communication technology—may provide insight into the perception, use, or adoption patterns of mobile wallet users. Equally problematic, *convenience* is discussed constantly in the consumer privacy literature, and particularly with regard to mobile payments, but it has not been adequately conceptualized.

Understanding mobile payment (from the consumer perspective) requires that both of these limitations be addressed. We argue that convenience has both temporal and spatial aspects, and define it as a *social or material arrangement used to reduce the experience of scarcity in time and/or space*. Relatedly, mobile wallet use has an inherent time-space contour wherein individuals effectively reshape, or rearrange, time and space to suit their communication goals (Castells, 2000). Therefore, the complementarity of these two perspectives suggests that considering the extent to which consumers' attitudes and behaviors regarding time and space predict their decision to adopt mobile payment may yield important practical and theoretical insights.

Participants

Study participants were recruited through a post on Mechanical Turk (www.mturk.com), an online platform operated by Amazon.com. MTurk is a crowdsourcing labor market in which employers ("requesters") post advertisements for human intelligence tasks ("HITs") and employees ("workers") perform those tasks for compensation. Participants were paid $1.00 for completing the scale. MTurk workers had to meet two criteria to participate. First, they had to be registered with Amazon.com as residents of the United States. Second, workers were required to have completed at

least 100 previous HITs in MTurk and have 95% or higher approval ratings from prior requesters. This requirement was suggested by Eyal, Vosgerau, and Acquisti (2014), who found that "high reputation" workers meeting this criterion are highly likely to follow task instructions and expend adequate effort to generate considered responses.

The scale was administered to respondents as online survey conducted using Qualtrics software (version 18.856s). Respondents gained access to the survey in Qualtrics via an advertisement posted in MTurk recruiting volunteers for a study about mobile wallet use. After providing informed consent and reading a brief overview of the study, participants completed the questionnaire. After completion, they were provided with a passcode to claim payment in MTurk.

We obtained responses from 472 participants who were moderate to high-tech users, 205 of whom self-identified as mobile wallet users. There were a large number of Millennials (71%), with an age range from 18 to 64 years old. The majority of respondents were men (64%), and their location was roughly divided across all regions of the United States. Most held a four-year degree (34.5%) or some college (32.8%), although the respondents also included a range of other educational levels. See Table 1 for more demographic characteristics.

Measurement Instruments

To explore the extent to which consumers' general attitudes and behaviors (regarding time and space) were predictive of their specific attitudes and behaviors about the time-space affordances of mobile wallet use, we used several previously validated and reliable measures.

Social Factors: Temporal Experience. Based on our working definition of convenience as a *social or material arrangement used to reduce the experience of scarcity in time and/or space*, we included subscales designed to measure *scarcity*, sense of *urgency* (which has been found as related to scarcity in previous research by Ballard and Seibold [2004]), *pace* of life (which Ballard and Seibold [2004] found broadly predictive of other time dimensions and a frequent response to feelings of time scarcity), and *time-space fluidity*. Participants were asked to rate a series of words and phrases in terms of how strongly they agreed or disagreed as representative of the way they referred to time (and, in some cases, space). The words and phrases were derived from descriptions of time, time views, and time use found in a variety of popular and scholarly literatures.

Confirmatory factor analytic procedures employing maximum likelihood estimation were used to arrive at a five-factor model that includes attitudes towards time (as a resource) as *Scarce* ($\alpha = .85$), *Available* ($\alpha = .94$), *and Urgent* ($\alpha = .87$) as well as behavioral patterns around participants' *Pace of life* ($\alpha = .94$) and *Time-Space Fluidity* ($\alpha = .76$). This model represents an additional factor, Abundance, not found in previous administrations of the scale. Given the moderate to high Internet use levels among our study participants, this finding is consistent with Castells' (2000) arguments that a "timeless time" emerges based on the social organization of network-based communication patterns.

Material Factors: Mobile Wallet Affordances. To assess participants' attitudes toward the spatiotemporal affordances of mobile wallet applications, we used previously validated measures that focused on the convenience, speed, and time-space advantages of using mobile payment. We used Kim, Mirusmonov and Lee's (2010) *convenience* subscale without any modifications. We modified Collier and Kimes' (2013) subscale designed to measure the convenience of online food ordering to focus on mobile wallet use using key aspects of Castells' (2000) description of the *timeless time and space of flows*. We also modified Collier and Kimes' (2013) *speed of transaction* subscale regarding online food ordering to the context of mobile wallet use.

Confirmatory factor analytic procedures employing maximum likelihood estimation were used to arrive at a three-factor model that includes *Convenience* ($\alpha = .83$), *Timeless Time/Space of Flows* ($\alpha = .83$), and *Speed of Transaction* ($\alpha = .84$).

Results

To explore whether consumer attitudes and behaviors associated with time and space are predictive of the likelihood to use a mobile wallet, a t-test was conducted for each dimension (*scarcity*, *availability*, *time-space fluidity*, sense of *urgency,* and *pace*) comparing mobile wallet users with non-users. Bonferroni corrections were used to protect against the risk of Type I error caused by multiple analyses: A significance level of $p \leq .01$ was employed.

T-test results revealed statistically significant differences in respondents' reported urgency ($p<.009$), availability ($p<.01$), and pace ($p<.001$). Mobile wallet users (urgency: $M = 3.25$, $SD = 1.25$; availability: $M = 2.96$, $SD = 1.44$) experienced their time as more urgent and more available than non-users (urgency: $M = 2.97$, $SD = 1.09$; availability: $M = 2.65$, $SD = 1.27$). Mobile wallet users ($M = 3.45$, $SD = 1.26$) also reported a faster pace of life than non-users ($M = 2.97$, $SD = 1.09$; availability: $M = 3.03$, $SD = 1.27$).

Table 1
Participants (N = 472)

Measure	*n*	%
Gender		
Male	303	64.2
Female	169	35.8
Education		
Did Not Complete High School	3	0.6
High School Graduate or GED	47	10
Some College	155	32.8
Two-Year College Degree	53	11.2
Four-Year College Degree	163	34.5
Master's Degree	45	9.5
Doctorate	2	0.4
Professional Degree	4	0.8
Income		
Below $20,000	82	17.4
$20,000 – $35,000	105	22.2
$35,000 – $50,000	110	23.3
$50,000 – $75,000	83	17.6
$75,000 – $100,000	42	8.9
$100,000 and above	50	10.6
Daily Internet Usage		
Less than 1 hour	6	1.3
1 – 2 hours	42	8.9
2 – 3 hours	86	18.2
More than 3 hours	338	71.6
Employment Status		
Employed full-time	201	42.6
Employed part-time	82	17.4
Unemployed:looking for work	57	12.1
Full-time student	93	19.7
Primarily work inside home	24	5.1
Retired	3	0.6
Other	12	2.5
Region		
West Coast	141	29.9
South	118	25.0
Midwest	92	19.5
East Coast	113	23.9
Other	8	1.7

Discussion and Future Directions

We have identified several reliable measures—both social and material—potentially relevant to mobile wallet adoption patterns. This includes five dimensions of time (and space), three of which predicted whether participants were mobile wallet users.

Participants' time *urgency* was associated with mobile wallet use, and this certainly reflects the marketing of mobile payment applications. For instance, an advertisement for ApplePay promises:

> *Paying in stores or within apps has never been easier. Gone are the days of searching for your wallet. The wasted moments finding the right card. Now payments happen with a single touch.*

Mobile wallets are designed for those too pressed for time to deal with the infrastructure and perceived inefficiency around credit card transactions.

Given the focus on convenience implicit in the ApplePay advertisement above, the absence of a relationship with *scarcity*—central to extant treatments of convenience and our working definition—is surprising. This may be accounted for by the fact that the opposite of scarcity, i.e., *availability*, was a predictor of mobile wallet adoption. It suggests that time-space construals may be reshaped in contemporary mobile communication practices. As globalization marks the obliteration of time and space, timeless time—rather than reflecting the scarcity associated with an industrial era—reflects the ever-presence of network era communication affordances.

A faster pace of life was also associated with mobile wallet use. Speed is explicitly promised in Google Wallet's advertising, including: "*Speed through online checkout*." and "*Spend instantly*." So while this finding about speed may be expected, the fact that reported time-space fluidity is not a significant predictor of mobile wallet use should be explored in future studies.

There are several next steps for this study. First, we will calibrate our respondents' knowledge and behavior concerning mobile wallet security with field experts, and determine whether identity management "literacy" moderates mobile wallet adoption patterns in our broader sample (of users and non-users). Additionally, once expert data is obtained, we will also use it to explore mobile wallet users behaviors in detail. This includes examining whether social factors, like time urgency or a faster pace of life, are associated with less secure identity management practices. As well, we can explore the extent to which our subscales about the desire for certain material affordances of mobile wallets—including convenience, timeless time/space of flows, and transaction speed—predict security practices.

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