Original Article

A Test of the Mobile Phone Appropriation Model:
A Comparison between Chinese and US Samples

Xinyi (Ceciley) Zhang [1], **Cameron W. Piercy** [2], and **Sun Kyong Lee** [3]

[1] Department of Communication, University of California, Santa Barbara

[2] Department of Communication Studies, University of Kansas

[3] School of Media & Communication, Korea University

Corresponding to

Sun Kyong Lee

School of Media & Communication, Korea University, 145 Anamro, Seongbukgu, Seoul, Korea, 02841

Email: sunnylee@korea.ac.kr

ABSTRACT

The mobile phone appropriation (MPA; Wirth et al., 2007, 2008) model is an integrative model that seeks to explain attitudes and behaviors related to mobile phone usage from a communication perspective, proposing a dynamic loop of metacommunication, evaluations, and usage patterns. Following a previous study (Lee & Cioena, 2023), the current research tests the MPA model with a Chinese sample collected through an online survey ($N = 510$) and compares it with the U.S. sample ($N = 501$) collected by Lee and Cionea (2023) using multigroup confirmatory factor analysis and multigroup structural equation modeling. Although the core structure of MPA model was shown to be tenable cross-culturally, the results of comparative analysis reveal some noticeable cultural differences in mobile phone appropriation and call for further model revisions. Noticeably, relational and social implications of mobile communication penetrate more aspects of mobile phone appropriation with greater strength in the Chinese sample, potentially due to the collectivistic Chinese culture, and the results demonstrate a paradox between perceived affordability and usage. The more Chinese participants evaluated the cost of mobile phone usage as a restrictive factor of MPA, corroborate the more they used it for relationship maintenance and daily schedule management. In addition, the results indicate some tensions between instrumental purposes and entertainment and symbolic usage unique to the Chinese context.

KEYWORDS

mobile phone appropriation, mobile communication, cross-cultural comparisons, multigroup confirmatory factor analysis, multigroup structural equation modeling

O ver 60% of the world's population uses mobile phones, and these portable devices are now even more important for Internet accessibility than computers (DataReportal, 2021). For many, checking mobile phones is the first thing they do after waking up every day and the last action to take before going to bed. Mobile phones are not only multifunctional tools assisting various professional and personal activities but also symbolic devices embedded with identity and cultural values (Goggin, 2008). While people favor mobile phones

for their usefulness and positive effects on life satisfaction, social cohesion, and conveniences (Wei et al., 2022), they also fear potentially negative outcomes brought by over-reliance on such technologies (Thomée, 2018). For example, intensive use of mobile phones could be associated with degraded physical fitness (Lepp et al., 2013), depression and anxiety (Coyne et al., 2019), low sleep quality (Exelmans & van den Bulck, 2016), and daytime dysfunction (Derks & Bakker, 2014).

In recent years, mobile phone adoption and usage have attracted great scholarly interests across disciplines, and everyday uses of mobile phones have been the most frequently investigated context (Kim et al., 2017). With the nearly universal adoption of cellular phones in such countries as the United States, Australia, China, and South Korea, the question goes above and beyond what kind of people choose to use them. More urgently, researchers seek to scrutinize how mobile phones are used differently across distinct socio-cultural groups and what outcomes such differences entail.

Kim et al. (2017) reviewed the most prominent theoretical frameworks employed in mobile communication research are general theories of technology adoption (e.g., Rogers' [2003] diffusion of innovation theory, Davis' [1989] technology acceptance model), which were not specifically invented for explaining mobile communication per se. Omnipresence, portability, availability, locatability, and multimediality fundamentally distinguish mobile media from other communication technologies (Schrock, 2015), so the field calls for more specialized theorization. Therefore, some scholars have developed theoretical frameworks particularly dedicated to mobile communication (e.g., Bayer et al., 2016; Katz & Aakhus, 2002; Ling, 2012).

Among all, the mobile phone appropriation (MPA) model is one of the few theoretical frameworks seeking to comprehensively explain mobile phone appropriation (Wirth et al., 2007, 2008). Rooted in the perspective of structuration theory, *appropriation* emphasizes the duality of technology structures (Orlikowski, 1992) and describes how people take an active role in selecting and determining the adoption and practices of technology, which may or may not be aligned with the *spirits* embedded by designers (DeSanctis & Poole, 1994). This perspective therefore overcomes the limitations of simple technological determinism or social constructionism (Leonardi, 2013) by recognizing that the variation in technology adoption and usage is jointly shaped by technology and social action. With the recognition that the meaning of media products is co-constructed by users, producers, and mass media, the term *appropriation* in the MPA model refers to "the process by which people adopt and adapt technologies, fitting them into their working practices" (Dourish, 2003, p. 465) and stresses that users achieve full ownership of products by fusing them into everyday life (Lee et al., 2016). Appropriation research differs from the adoption research and examines mobile communication above and beyond the binary choice of adoption (i.e., use and non-use).

In prior studies, the MPA scale was tested in its validity and reliability with a German and a US sample (Lee et al., 2016; Wirth et al., 2007), and the proposed model structure was later tested with a larger US sample (Lee & Cionea, 2023). However, it remains unclear whether the theoretical constructs and relationships stay equally applicable in non-Western contexts. Taking an approach of multigroup structural equation modeling, the current research examines the factor structure and relationships proposed by the MPA model with a Chinese sample to assess its compatibility with non-Western culture. With established measurement invariance, the study further discusses the similarities and differences in mobile phone appropriation across cultures by comparing path coefficients between the Chinese sample and the US sample collected by Lee and Cionea (2023).

The MPA Model

The MPA model developed by Wirth et al. (2007, 2008) proffers an integrative framework for explaining individuals' mobile phone appropriation patterns from a communication perspective. This model synthesizes factors from five extant frameworks: diffusion of innovation (Rogers, 2003), theory of planned behavior (Ajzen, 1985), cultural studies (Silverstone & Haddon, 1996), frame analysis (Höflich, 2003), and uses and gratifications theory (Katz et al., 1973). Building upon previous frameworks, the MPA model conceptualizes mobile phone appropriation as a dynamic and creative process rather than binary choices and attempts to merge the divergence between qualitative and quantitative perspectives. The model contains three major components (see Figure 1): metacommunication, usage beliefs, and actual usage behavior.

The first dimension, metacommunication (i.e., communication about mobile phones), originally included three subdimensions: (a) interpersonal communication concerning features and functions of mobile phones, (b) mass communication regarding mobile phone usage, and (c) observations of other people's usage behavior. The second dimension, evaluation, is people's assessment of (a) functional, (b) symbolic, (c) normative, and (d) restriction dimensions of mobile phones. Finally, actual usage of mobile phones contains

Figure 1. *The MPA Model Proposed by Wirth et al. (2008)*
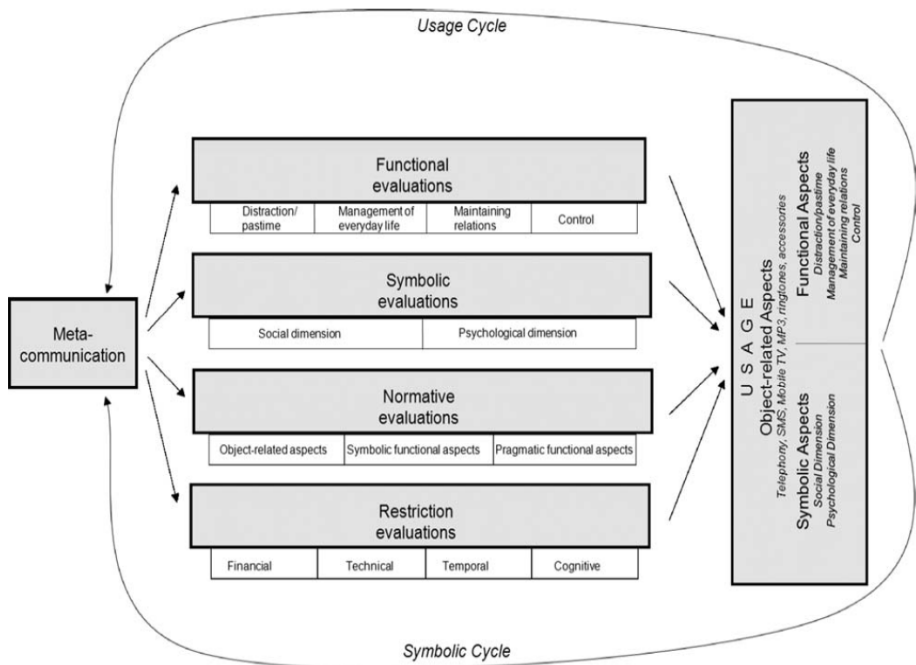
Note. Wirth, W., von Pape, T., & Karnowski, V. (2008). An integrative model of mobile phone appropriation. *Journal of Computer-Mediated Communication, 13*(3), 593–617. (CC BY 4.0) p. 606, Figure 1.

two parts: functional (i.e., control, distraction/ pastime, management of daily schedule, and relationship maintenance) and symbolic (i.e., social and psychological) usage. Starting from metacommunication, the MPA model posits individuals develop beliefs about different usage dimensions, which eventually impact their usage behavior, both functionally and symbolically (Wirth et al., 2008). Presenting mobile phone appropriation as a constant circulation, the model strives to capture the complex dynamics of everyday mobile phone usage.

The MPA model has made an impact in the field of mobile communication research. The 89-items scale accompanying this model was originally developed in German by Wirth et al. (2007) and later translated into English by Lee et al. (2016). Most subscales achieved good reliability after modification with the English scales via confirmatory factor analyses (CFAs). On the qualitative side, Humphreys et al. (2013) conducted interviews guided by MPA in the US and Germany to explore the perceptions of those characteristics of mobile Internet as well as extractive versus immersive usage, surprisingly finding little cross-cultural difference in metacommunication and handling of mobile Internet. Research by Aricat et al. (2015) simplified the circular model and focused on the interactions amongst three components: metacommunication, pragmatic usage, and symbolic usage (usage prestige and social identity). The findings revealed four types of mobile phone users (i.e., convenience seekers, experimenters, group communicators, and tabula rasa) in an Indian Malayali community in Singapore, related with three mindsets toward migrant acculturation (i.e., culture campaigner, culture connoisseur, and culturally petrified). On the quantitative side, Lee and Cionea (2023) further examined the relationships between the proposed factors with a US sample and found the overall MPA model received partial support via structural equation modeling.

These studies established MPA to be a viable theoretical framework for assessing mobile phone appropriation across cultures.

As a follow-up study to Lee and Cionea (2023), the present study first analyzes the MPA model's compatibility with a Chinese sample using a translated (and back-translated) Chinese scale. Based on the original MPA model proposed by Wirth et al. (2008), the initial hypotheses are proposed as below, which are later revised based on the results of the multigroup CFA in the current paper.

H1: Levels of metacommunication will be positively associated with levels of (a) functional, (b) symbolic, (c) normative, and (d) restrictive evaluations.

H2: Levels of functional evaluations will be positively associated with levels of (a) functional and (b) symbolic aspects of usage.

H3: Levels of symbolic evaluations will be positively associated with levels of (a) functional and (b) symbolic aspects of usage.

H4: Levels of normative evaluations will be positively associated with levels of (a) functional and (b) symbolic aspects of usage.

H5: Levels of restrictive evaluations will be negatively associated with levels of (a) functional and (b) symbolic aspects of usage.

Cultural Influences on Mobile Phone Appropriation

Mobile Communication in China and the US

Both China and the US are countries with high mobile phone penetration rates. China has the largest number of smartphone users in the world (918.45 million; 74.5% penetration rate by 2023; Statista.com), and the US has the third largest user group (207 million; Wei et al., 2022; 86.7% penetration rate). If non-smart cellular phones are also considered, penetration of mobile phone ownership is even greater. Also, mobile phone use is substantial in people's daily life for both

countries. Before the COVID-19 pandemic, Chinese adults spent 2.5 hours on mobile phones every day (Liu, 2020) whereas Americans spent 2.9 hours on average (Wurmser, 2019). Because of quarantines, people's usage amount significantly grew from 2020 to 2021 (China Internet Watch, 2021; O'Dea, 2021). The large number of users and considerable usage duration make mobile phone appropriation an essential research topic for both countries, along with the expansion of international business and intercultural contacts.

Yet scholarly attention has been paid to China unproportionally, compared with the US and South Korea, where most of the mobile communication research has been conducted (Wei et al., 2022). By reviewing the publications on mobile communication from major communication journals, Wei et al. (2022) revealed the number of studies in the US context is seven times greater than those taking China as the study site, although China has three times as many users. More scholarly attention needs to be paid to the unique context of Chinese mobile communication, and our research can provide some important insights into how it differs from the American context (Ang & Zhou, 2023). More broadly, research findings can provide a more in-depth understanding of both universal and culturally specific factors that influence mobile phone appropriation.

The Individualism-Collectivism Dimension

The current study further explores psychometric equivalence and factor structures of the MPA model to examine its applicability above and beyond cultural heterogeneity, and the large cultural distance between China and the US makes them good reference points for each other (Shi & Wang, 2011). One factor contributing to cultural differences in mobile phone appropriation is the individualism-collectivism (IC) dimension. While Chinese culture is typically considered collectivistic, where individuals are tightly linked to their social

units, the culture of the US is considered highly individualistic, where kin connections are much weaker (Hofstede, 1980). In fact, the meta-analysis conducted by Oyserman et al. (2002) showed that China and the US make an ideal contrast because China is the only Asian country that consistently exhibits large effects of both low individualism and high collectivism, as opposed to the US, a country with high individualism and low collectivism.

Whereas mobile phones are considered devices promoting individualism in the West, mobile communication research has illustrated they can be reaffirming collectivism under collectivistic cultures such as South Korea (Yoon, 2003) and China (Holmes et al., 2015). Previous studies have also shown the IC dimension has significant influences on mobile phone use. For example, Arpaci (2019) found that horizontal collectivism, which emphasizes ingroup equality and social harmony, is positively associated with anxious attachment to mobile phones in Turkey, and that collectivism reduces the impacts of perceived ease of use on perceived usefulness of mobile phones in Jordan (Faqih & Jaradat, 2015). In sum, cultural values and norms can moderate people's mobile appropriation behavior.

Observed Differences in Beliefs and Usage

As proposed by van Biljon and Kotzé (2008), mobile phone usage is greatly determined by the sociocultural context beyond technological usability and functionality. An ongoing line of research has focused on how new media are utilized differently across cultures (Shuter, 2012). On the macro level, numerous studies (e.g., Stump et al., 2008; Vimalkumar et al., 2020) have explored national mobile phone diffusion and use with a broad focus on social, economic, and political factors affecting global digital divides and national information technology infrastructures (Qiu, 2010). Besides, some studies have revealed how cultural backgrounds, in addition to micro-level individual characteristics (e.g., income, education,

age, gender), influence mobile phone usage despite the pressing uniformity of mobile communication across countries (Katz & Aakhus, 2002). Past literature contains three prominent themes revealing significant cultural differences associated with individuals' attitudes towards mobile phones and their use behavior: mobile communication norms, purchase intentions, and usage patterns.

For communication norms, Mante (2002) noted that Dutch participants sensed less responsibility of being socially reachable and more repulsion against work interfering with personal lives. Similarly, Caporael and Xie (2003) found that Chinese and American users had different ideas about whether it was acceptable to receive phone calls after work. Campbell (2007) collected college student samples from Hawaii, Japan, Sweden, Taiwan, and the US, and showed that the Japanese were less tolerant of mobile phone use in public and that the Swedish attached more importance to security. Khattab and Love (2009) showed Sundanese participants were more willing to turn off phones in certain public spheres than British people. Shuter and Chattopadhyay (2014) found Danish and American people have different attitudes toward using mobile phones during face-to-face conversations in different settings with different relational partners. Altogether, these studies indicate mobile phones are appropriated differently across cultures regarding when to connect and whom to connect with.

For purchase intentions, Lee et al. (2013) found innovation factors had stronger effects on Americans' adoption decisions, while Koreans relied more on evaluations from other like-minded individuals. Concerning the symbolic meanings associated with mobile phones, Katz et al. (2003) observed Korean youth perceived mobile phones to be more expensive, stylish, and necessary than Americans, and Cui et al. (2007) identified Asians were more likely to decorate their phones than Europeans and Americans for self-display. Hoang (2015) asserted there are significant differences between Vietnamese

and Finnish consumers in terms of shopping intentions and consciousness. Overall, past research indicates different cultures attach distinct identity values and symbolic meanings to mobile phones, with collectivistic cultures demonstrating greater social influences.

For usage patterns, Peltonen et al. (2018) pointed out low power distance and high individualism were related to greater usage of leisure-type apps, and Lee et al. (2002) found that Koreans perceived more emotional values in mobile communication while Japanese paid more attention to functionality. Worthington et al. (2012) found Germans were more likely to consider business and emergency as primary purposes of mobile phone usage beyond keeping in touch with family/ friends than people from Finland, Korea, and the US, and different cultures had distinct norms for privacy management. In general, it appears that collectivistic cultures attach more importance to the social dimension of mobile phone usage compared to the cases of individualistic cultures.

The extant literature primarily explores specific user behavior instead of systematically investigating multiple aspects of mobile phone appropriation. Thus, this study takes the integrative approach induced by MPA and simultaneously focuses on the connections amongst meta-communication (i.e., communication about mobile communication), user beliefs, and usage behavior. The study also fills some gaps in US-China comparison research, as prior cross-cultural comparisons of mobile phone appropriation between the two countries are scant.

The generalization made by Katz and Aakhus (2002) through a series of empirical studies is that different cultures exhibit striking similarities in mobile phone appropriation, so we expect the MPA model to be tenable across cultures. Before further exploring cultural influences on mobile phone appropriation, we need to first investigate whether different cultures interpret different components of the MPA scale in similar manners. Therefore, we requested the US data from Lee

and Cionea (2023), collected a Chinese dataset using similar sampling parameters, and conducted a multigroup CFA to examine scale compatibility across two cultures' samples.

> RQ1a: Is the MPA scale comparable between a Chinese and an English version?

Cross-Cultural Comparisons of MPA

As discussed above, we expect to observe some nuances in mobile phone appropriation despite overarching cross-cultural similarities. Given the large IC difference, Chinese people's beliefs and usage may be more closely linked to what is considered socially normative in the cultural context than Americans' (Meng & Kim, 2020). With high collectivistic values, Chinese people may pay more attention to other community members' opinions on social occasions and attach greater importance to communication regarding social norms of mobile phone usage than Americans. As the metacommunication component of the MPA model spotlights how personal beliefs and evaluations of mobile phones can be jointly shaped by personal connections, social environment, and mass media and highlights the social discourse of mobile phone appropriation the effects of metacommunication may be stronger in China.

It is also possible that mobile phones are appropriated with more collectivistic purposes (e.g., social obligations, cohesion, support) in China than in the US due to the cultural emphasis on kinship and relationship maintenance. Predictably, Chinese people may draw greater connections between metacommunication and relationship maintenance as well as control. Furthermore, Chinese people may attach greater symbolic values to mobile phones, encompassing both social status display and psychological attachment, as indicated by past research on purchase intentions (Cui et al., 2007; Hoang, 2015; Lee et al., 2013).

The patterns of mobile phone appropriation

may differ across cultures owing to distinct cultural norms and values, and the strength of cultural norms and social influence may also vary across cultures. Thus, we consider whether the associations between different components significantly differ by culture with established sample comparability. Although we could speculate over the potential differences, we propose the following research questions to maximize parsimoniousness in multigroup comparisons:

> RQ1b: What differences, if any, are present in the factor structure of the MPA in the Chinese and US sample?
>
> RQ1c: What differences, if any, are present in the path magnitude of the MPA in the Chinese and US sample?

METHOD

Participants

Both Chinese and US samples were drawn from general populations, and the sampling parameters for the Chinese sample were set in the way to maximize its comparability with the US sample, which was collected by hiring the same online survey panel service. There were 510 completed surveys in total by Chinese and 502 by US participants. For the Chinese sample, approximately half of the participants were males ($n = 260$), and half were females ($n = 250$). For the US sample, there were 251 male participants, 250 female participants, and 1 non-binary participant. For the Chinese sample, age was distributed as follows: 18 to 29 (20.6%); 30 to 39 (21.96%); 40 to 49 (21.6%); 50 to 59 (21.6%); and above 60 (14.31%). For the US sample, age was distributed as follows: 18 to 29 (19.9%); 30 and 39 (19.9%); 40 to 49 (20.1%); 50 and 59 (19.9%); and above 60 (20.1%).

Most Chinese participants were Han Chinese (95.9%), followed by Hui Chinese (0.8%), Uighurs

(8.5%), Mongolians (0.6%), Tibetans (0.2%), and others (2.5%). Many American participants were non-Hispanic white (73.5%), followed by Hispanic (9.0%), African American (8.8%), Asian American (6.6%), native American (0.6%), and others (1.4%). For educational backgrounds, 75.7% of Chinese participants had college education, with 17.5 % high school education or below and 6.8% graduate-level education; whereas 61.8 % of American participants had college education, with 22.5 % high school education or below and 15.7% graduate-level education. The medium monthly income of Chinese participants was between 7,000 and 9,999 RMB (between approximately 1000 and 1,500 USD), and the medium monthly income for US participants was between 4,000 and 4,999 USD.

Procedures

The data for both samples were collected through a professional survey company, SurveyMonkey, during summer 2016. As compensation, the researchers paid $5 per response to the company for collecting data from their Chinese and US panelists. Two bilinguals between Chinese and English participated in translation and back-translation of the Chinese MPA scales. Before filling out the survey, participants were informed of the general study purpose and asked to report their demographic information. See Appendix A for descriptive statistics of the key variables across cultures and scale reliability scores and Appendix B for the Chinese and English measures. The reliability scores reported below are calculated with two samples combined.

Measures

Metacommunication
Metacommunication (MC) was measured with sixteen 5-point Likert scales (1 = *Never*, 5 = *Very*

Often), five of which measured the interpersonal (MCIP), five of which measured mass media (MCMC), and six of which measured observational (MCOB) dimension of metacommunication (Lee & Cionea, 2023). All metacommunication items were retained and combined in the final model (Cronbach's α = .96).

Functional Evaluations. Evaluations on functional aspects of mobile phone use (FE) were measured with sixteen 5-point Likert scales (1 = *Strongly Disagree*, 5 = *Strongly Agree*)[1], including four subdimensions: (a) distraction/pastime (FEDIS1 to FEDIS4), (b) organization of daily lives (FEORG1 to FEORG4), (c) staying connected (FECONN1 to FECONN4), and (d) control (FECONT1 to FECONT4) (Lee & Cionea, 2023). Through the analysis, the FEDIS scale was dropped, and FEORG was retained, α = .78. All FECONN and FECONT items were combined, α = .87.

Symbolic Evaluations. Nine items were used to measure two subconstructs of symbolic evaluations (SE) (Lee & Cionea, 2023): social (SESO1 to SESO4) and psychological (SEPS1 to SEPS5). Three items for each subconstruct were retained, and both SESO (α = .75) and SEPS (α = .87) were reliable.

Normative Evaluations. Normative evaluations (NE) were measured with fourteen items (Lee & Cionea, 2023). The NE scale was dropped during the multigroup invariance testing (see below, p. 15).

Restrictive Evaluations. Four items were used to capture participants' restrictive evaluations (RE) of mobile phones, including economic, temporal, and technical factors (Lee & Cionea, 2023). Three items were retained in the RE scale (α = .74).

Functional Aspects of Usage. Four subdimensions of the functional aspects of usage (FA) were assessed with twenty-two items (Lee & Cionea, 2023). Six items measured control (FAC); six items measured distraction/pastime (FAD); five items measured

---

[1] Hereafter, all 5-point Likert type scales were measured with the same interval.

management of daily schedule (FAM); and five items measured relationship maintenance (FAR). All items were retained in FAC ($\alpha = .91$), FAD ($\alpha = .94$), and FAM ($\alpha = .91$). One item was dropped from FAR, and the revised subscale was reliable ($\alpha = .88$).

Symbolic Aspects of Usage. Eight items measured the two subdimensions of symbolic aspects of usage (SA) (Lee & Cionea, 2023). One item was dropped from social (SASO; $\alpha = .87$) and two items were dropped from psychological usage (SAPS; $r = .70$).

RESULTS

Multigroup Confirmatory Factor Analysis of MPA Scales and Invariance Testing

Before running structural equation modeling (SEM), a multigroup confirmatory factor analysis (MGCFA) was conducted with the R package, lavaan 0.6-14 (Rosseel, 2012) software with maximum likelihood (ML) estimation. Hu and Bentler (1999) emphasize that "it is difficult to designate a specific cutoff value for each fit index," but nonetheless suggest values for a "relatively good fit" (RMSEA $\leq .06$, CFI $\geq .95$, and SRMR $\leq .08$; p. 449). High correlations (Tabachnick & Fidell, 2019) were found between three subconstructs of metacommunication (r between .94 and .96 across samples). Likewise, the FEDIS and FEORG were highly correlated in the Chinese sample ($r_{China} = .97$, $r_{US} = .75$), and FECONT and FECONN were also highly correlated ($r_{China} = .94$, $r_{US} = .98$). SESO and NE were also highly correlated ($r_{US} = .92$ and $r_{China} = .99$). Each of these values indicated multicollinearity, and the subdimensions were collapsed for (a) metacommunication and (b) FECONN and FECONT, as advised by Brown (2015). Because FEDIS and FEORG are more varied constructs, and because FEDIS had two poorly loading indicators, only FEORG was retained. Further, given the construct overlap

between NE and SESO and the poor loadings for six NE indicators across samples (as in Lee & Cionea, 2023), we chose to drop NE.

DeVellis (2016) suggests that latent variables and indicators should share a moderate relationship ($r^2 > .30$, see Appendix A), we used this criterion for retaining indicators in both sampled groups. In line with measures reported above, five indicators with low loadings were iteratively removed and three indicators were removed as modification indices demonstrated cross-loading on multiple latent constructs. Error covariances were allowed between measurement items sharing similar phrasing or meaning within any given latent construct, but not between constructs. The final model met some, but not all, of Hu and Bentler's (1999) criteria: RMSEA = .051, CFI = .904, and SRMR = .064. Because this combined sample exceeds 1,000 participants and because CFI is definitionally contingent upon unique variances and is harmed in models with high levels of shared variance among latent constructs (Moshagen & Auerswald, 2018), we consider the fit acceptable. Given that normative evaluations and distract/pastime dimension of functional evaluations were excluded and that subdimensions of metacommunication as well as functional evaluations of control and connections were combined, some parts of the initial hypotheses were not testable. In the following, we only report results of those hypotheses that were testable after these modifications.

MGCFA facilitates measurement invariance testing to assess the psychometric equivalence of the models across the US and Chinese samples (Putnick & Bornstein, 2016). The model proceeded through three steps. First, establishing a baseline configural model which assesses model fit given multiple groups. This model assesses if the latent constructs have "the same meaning across groups" (Kühne, 2013, p. 155). The second model tests for metric invariance. Metric invariance implies "each item contributes to the latent construct to a similar degree across

groups" (Putnick & Borenstein, 2016, p. 75). To test this assumption, we constrained the loadings across groups and computed a nested version of the configural model. The third, more stringent model tests for scalar invariance. Scalar invariance is constrained to both loadings and intercepts, which is also called strong factorial invariance (Kühne, 2013). When present, scalar invariance "generally supports cross-group comparisons of manifest (or latent) variable means on the latent variable of interest" (Rutkowski & Svetina, 2014, p. 35). Fit statistics across each invariance test are presented in Table 1.

Given the complexity of the models, it was unlikely that changes in χ^2 between the nested models which follow would be non-significant. This is because "χ^2 is overly sensitive to small, unimportant deviations from a 'perfect' model in large samples" (Putnick & Bornstein, 2016, p. 78). Thus, we used the alternative fit indices (i.e., ΔRMSEA, ΔCFI, and ΔSRMR) to assess fit. Specifically, we followed the guidance suggested by Rutkowski and Svetina (2014), ΔRMSEA < .03, ΔCFI < -.02, and ΔSRMR ought not exceed .03 for metric invariance (Putnick & Bornstein, 2016). For scalar invariance, these criteria are more stringent: ΔRMSEA < .01, ΔCFI < -.01, and ΔSRMR < .015 (Putnick & Bornstein, 2016). The models met assumptions for configural and metric invariance, signaling the latent constructs are psychometrically similar and comparable across cultural contexts. But the models did not quite meet the criteria for scalar invariance, signaling that it was inappropriate to compare means between the two countries. The baseline configural model and constrained comparison model statistics are presented in Table 1.

Analysis Plan

With metric invariance established, we utilized multi-group SEM (MGSEM) for hypothesis testing, we used maximum likelihood estimation. Though the results are similar to Lee and Cionea's (2023), our results differ slightly because we use the multigroup approach to revise the model, including scale item inclusion. MGSEM yields separate χ^2 values but a combined set of fit indices. For the Chinese data, χ^2 = 4713.83, df = 1828. For the US data, χ^2 = 4824.48, df = 1828. The model fit reasonably well, given the complexity: RMSEA = .06, CFI = .88, and SRMR = .09. Figure 2 presents the results from the US and Chinese sample.

Hypotheses Testing

Results for H1

For H1, metacommunication was positively predicted the functional evaluations on daily organization of life (β = .72, p < .001) and the combined factor of staying connected and control (β = .61, p < .001), which supported H1a. Metacommunication was significantly associated with social symbolic evaluations (β = .79, p < .001) and psychological symbolic evaluations (β = .36, p < .001), which supported H1b. It was also positively associated with restrictive evaluations (β = .15, p = .005), which supported H1d. In all, H1 was fully supported with the exception that H1c was not testable due to the removal of normative evaluations. Metacommunication had great explanatory power on functional and symbolic evaluations, and its effects on restrictive evaluations were comparatively smaller (see Figure 2).

Table 1. *MGCFA Testing Model Invariance*

Model	χ^2	df	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Configural	8332.93	3624	.90	.05	.06	-	-	-
Metric	8500.21	3675	.90	.05	.06	.003	.000	.001
Scalar	9403.45	3726	.88	.06	.07	.02	.004	.004

Results for H2

The analysis results partially supported H2a. Functional evaluations for organization of daily lives were significantly associated with functional usage for relationship maintenance ($\beta = .16$, $p < .001$) and management of daily schedule ($\beta = .40$, $p < .001$) but not with control ($\beta = -.07$, $p = .156$) or distraction/pastime ($\beta = -.05$, $p = .426$). Functional evaluations of staying connected and control were associated with three dimensions of functional usage: control ($\beta = .50$, $p < .001$), distraction/pastime ($\beta = -.11$, $p = .030$), and relationship maintenance ($\beta = .50$, $p < .001$), but not with organization of daily lives ($\beta = .04$, $p = .333$).

The findings also partially supported H2b. Functional evaluations of organization of daily lives were positively associated with the social dimension ($\beta = .13$, $p = .013$) but not with the psychological dimension ($\beta = .01$, $p = .813$) of symbolic mobile usage. While functional evaluations of staying connected and control were negatively associated with the social aspect

of symbolic usage ($\beta = -.17$, $p < .001$), this combined factor was positively associated with the psychological aspect of symbolic usage ($\beta = .34$, $p < .001$). Figure 2 shows significant paths and amount of variance explained.

Results for H3 and H5

For H3a, social symbolic evaluations were positively associated with functional usage for distraction/pastime ($\beta = .54$, $p < .001$) and daily life organization ($\beta = .47$, $p < .001$) but not with relationship maintenance ($\beta = .02$, $p = .736$). Conversely, social symbolic evaluations were negatively associated with control ($\beta = -.13$, $p = .016$), which contradicted the hypothesis. Psychological symbolic evaluations were positively associated with three dimensions of functional usage: control ($\beta = .61$, $p < .001$), distraction/pastime ($\beta = .21$, $p < .001$), and relationship maintenance ($\beta = .33$, $p < .001$). However, it was negatively linked to management of daily schedule ($\beta = -.21$, $p < .001$), which contradicted

Figure 2. *Paths Coefficients and Variances Explained in the Chinese (left) and US Sample*
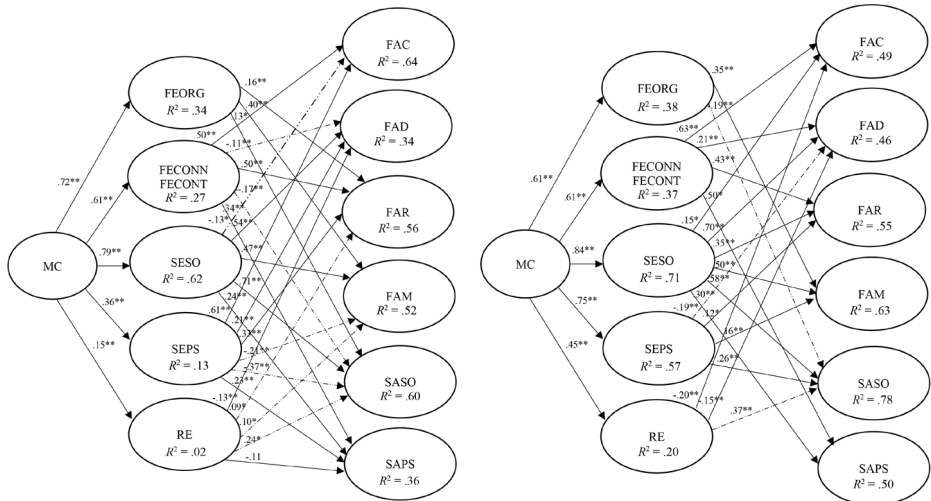
Note. Dashed paths are significant in the opposite direction of the hypotheses. $^*p < .05$; $^{**}p < .01$

the hypothesis. Thus, H3a was partially supported for social symbolic evaluations except for functional usage for control and was supported for psychological symbolic evaluations except for functional usage for managing daily schedules.

For H3b, social symbolic evaluations were positively associated with both the social (β = .71, p < .001) and psychological (β = .24, p < .001) dimension of symbolic usage. Furthermore, the psychological symbolic evaluations were positively associated with the psychological dimension (β = .23, p < .001), but negatively with the social dimension (β = -.37, p < .001) of symbolic usage. Thus, H3b was partially supported with the positive associations between social symbolic evaluations and two dimensions of symbolic usage as well as a positive association between psychological evaluations and psychological usage, but the analysis also indicated a negative relationship between psychological evaluations and the social aspect of usage, which was unexpected.

H4 was not testable due to the removal of the normative evaluations dimension from CFA. For H5a results showed restrictive evaluations were not associated with functional evaluations on control (β = .004, p = .912), but the paths from restrictive evaluations to distraction/pastime (β = -.13, p = .006), management of daily schedule (β = .09, p = .048), and relationship maintenance (β = .10, p = .028) were significant. Overall, H5a was supported for functional usage for distraction/pastime but not for other dimensions. Contradicting H5a, there were positive associations between restrictive evaluations and usage for managing daily schedules and relational maintenance. Regarding H5b, restrictive evaluations were negatively related to the psychological aspect (β = -.11, p = .022) but were positively associated with the social aspect of symbolic usage (β = .24, p < .001) in the opposite direction of the hypothesized. In summary, H5b was not supported for social aspects but was for psychological aspects of symbolic usage.

Exploring RQ1

For RQ1a, the results of MGCFA demonstrated that these two models were metric invariant but did not meet the criteria for scalar invariance. Thus, it was appropriate to compare paths but not means between the Chinese and US data. It was worth noting these results varied slightly from published models from Lee and Cionea (2023) because during the MGCFA, we retained several different indicators and relationships to improve model fit in both US and Chinese results. RQ1b asked what differences emerged when comparing the significant paths in the Chinese and US models, and RQ1c asked if there were significant differences of path magnitude in the two models. Figure 2 showed the contrast.

In both samples, there were positive relationships between metacommunication and all evaluation dimensions. Based on the z-score differences across the samples, we could conclude that the path coefficient from metacommunication to the psychological dimension of symbolic evaluations was greater in the US sample (z = 13.62) than that of the Chinese sample (z = 7.10), p < .001, and the path from metacommunication to restrictive evaluations was stronger in the US sample (z = 8.65) than it was in the Chinese sample (z = 2.83), p < .001. The differences imply that metacommunication was more closely related to these two factors in the US sample in comparison to the Chinese sample.

The associations between functional evaluations and two aspects of usage varied in a few ways between the Chinese and US participants. For functional usage, there was no significant relationship between functional evaluations of connection and control and functional usage for relationship maintenance in the US data, while the relationship was significant in the Chinese sample (β = .16, p < .001). Although the combined dimension (functional evaluations of connection and control) was significantly associated with functional usage for distraction/pastime, the relationship was positive in the US sample (β =

.21, $p < .001$) while being negative in the Chinese sample ($\beta = -.11, p = .003$).

For symbolic usage, the association between the functional evaluations on organization of daily lives and social aspect of usage was negative in the US sample ($\beta = -.19, p < .001$) but positive in the Chinese sample ($\beta = .13, p = .013$). In addition, the association between the functional evaluations on connection and control and social aspect of symbolic usage was non-significant in the US sample, but negative in the Chinese sample ($\beta = -.17, p < .001$). The z-score differences indicated that the remaining significant paths did not significantly differ across samples.

For symbolic evaluations, there were several variations. In terms of functional usage, the social evaluations were positively related to usage for control in the US sample ($\beta = .15, p = .028$), in the opposite direction of the Chinese findings ($\beta = -.13, p = .016$). Further, there was a significant relationship between social evaluations and functional usage for relationship maintenance in the US sample ($\beta = .35, p < .001$), while there was not one in the Chinese sample.

For the psychological evaluations dimension, it was significantly associated with usage for control only in the Chinese sample ($\beta = .61, p < .001$) but not in the US sample. The dimension was negatively associated with usage for distraction/pastime in the US sample ($\beta = -.19, p = .002$) but positively in the Chinese one ($\beta = .21, p < .001$), and it was positively associated with usage for daily schedule management in the US sample ($\beta = .16, p = .005$) but negatively in the Chinese sample ($\beta = -.21, p < .001$). The z-score difference indicated that the path from the psychological evaluations to relational usage was stronger in the Chinese sample ($z = 6.82$) than it was in the US sample ($z = 2.15$), $p < .001$.

In terms of social usage, a reversed relationship between psychological evaluations and social usage was observed in the Chinese sample ($\beta = -.37, p < .001$) while the relationship was positive in the US sample ($\beta = .26, p < .001$). The analysis also revealed a positive association between psychological evaluations and psychological usage in the Chinese sample ($\beta = .23, p < .001$), which was non-significant in the US sample. The z-score differences indicated that the remaining significant paths did not significantly differ across samples.

Finally, restrictive evaluations had many changes from the US to the Chinese data. We found restrictive evaluations to be positively associated with social usage in both the US ($\beta = .37, p < .001$) and Chinese ($\beta = .24, p < .001$) sample. There was a negative relationship to usage for control in the US data ($\beta = -.20, p < .001$), while there was no such relationship in the Chinese data. Restrictive evaluations were not significantly associated with usage for management of daily schedule or relationship maintenance and psychological usage in the US sample but were positively associated with usage for daily schedule management ($\beta = .09, p = .048$) and relationship maintenance ($\beta = .09, p < .001$) as well as psychological usage ($\beta = -.11, p = .022$) in the Chinese sample. By comparing the z-score differences, we observed a stronger association between restrictive evaluations and social usage in the US sample ($z = 7.82$) than that of the Chinese sample ($z = 5.12$), $p = .007$. In all, contrasting the Chinese and US models, there were 15 paths with varied signs, new, or missing relationships, out of 35 total possible paths. That means there were 20 paths of the same valence and similar significance, four of which had different magnitude across cultures. We discuss these differences and similarities in greater detail below.

DISCUSSION

The current study tested the MPA model (Wirth et al., 2007, 2008) with a Chinese sample and compared the mobile phone appropriation patterns of Chinese participants with those of a US sample collected by Lee and Cionea (2023) *post hoc*. Overall, the test results bolstered the

core logic of MPA (i.e., "metacommunication-evaluations-usage") within the Chinese sample, and multiple strong path coefficients that indicated the MPA model had satisfactory explanation power, with the model explaining more than 30% of factor variances for eight latent factors out of 10. The findings also suggested it was edifying to discriminate between functional, symbolic, and restrictive aspects of mobile phone evaluations as well as the functional and symbolic aspects of usage. In the following section, we discuss several issues of the MPA model revealed by MGCFA and MGSEM and highlight the potential influences of cultural contexts.

Measurement of the MPA across Cultures

The CFA results revealed some problems of this 89-item MPA scale. First, the high correlations in the study suggested that the factor structures of metacommunication and symbolic evaluations should be reconsidered. Corresponding with Lee and Cionea (2023), the present study found three subconstructs of metacommunication (i.e., interpersonal, mass-mediated, and observational) had poor discriminant validity and issues with multicollinearity. Different aspects of metacommunication might have been measured without enough distinction, or the participants might have processed metacommunication holistically.

As media technology rapidly advances, it is no longer easy to make clear distinctions between interpersonal and mass communication via any technology, as described by O'Sullivan and Carr's (2018) concept of *masspersonal communication*. The participants might not have precisely identified information sources (e.g., a person, or a person shown in the mass media) when asked to recall metacommunication related to mobile phones.

Additionally, the present study also found empirical overlaps between functional evaluations for control and connectivity. As argued by Lee

and Cionea (2023), the dimension of control evaluations seemed to include two types of control: accessibility (e.g., "It is important for me to be available 24/7") and environmental surveillance (e.g., "It is important for me to be in control of my surroundings"). The former emphasizes control exerted on self-behavior, which also overlaps with the relationship maintenance need, while the latter focuses on control exerted on the external environments, which may have negatively impacted the internal consistency of this subscale. Also, the connectivity dimension appears to overlap with control by asking participants to indicate how important it was for them to always know what was going on with significant others (environmental surveillance) and to always stay in touch with friends and family (accessibility), which can explain why the two factors were highly correlated in both samples. Moreover, the evaluation subscales differed from the corresponding usage subscales for connectivity and control in the way that control usage subscale only focuses on accessibility, and the relational usage subscale only focuses on relationship maintenance. Thus, the conceptualization and operationalization of control and connectivity evaluations should be reconsidered in their future measurement and to align better with the ones for usage.

Noticeably, two dimensions were dropped from the scale: functional beliefs on distraction/pastime and normative evaluations. The distraction subscale was excluded due to its high correlation with the organization of daily lives subscale, indicating the dimensions highly overlapped for the participants. Two items from the distraction/pastime subscales were closely related with management of daily schedules and chronemic expectations, such as "It is important to me that I do not waste my time with anything during the day," which offers an explanation why their factor loadings were poor. The subscale for normative evaluations was excluded partially due to the lack of internal consistency. This subscale contained both

positively and negatively worded statements (see Appendix B), encompassing both communication norms (when and where to use mobile phones) and social implications of usage (how other people think of certain use behavior), which makes the subscale problematic. Herein, we advocate for further revisions of these two subscales.

Model Structure

Given that only H1 was fully supported, with other hypotheses being partially supported, the findings revealed some practice of mobile phone appropriation in the Chinese sample that deviated from the predictions made by the MPA model. The MGCFA and MGSEM results further unmasked some interesting cultural differences. In this section, we discuss the missing paths after comparing two samples, highlight those paths with reversed relationships, and elucidate the observed differences in path magnitude.

First, the analysis revealed seven significant paths in the Chinese sample that the US sample did not contain: from functional evaluations of connectivity and control to (a) functional usage for relationship maintenance and (b) social usage; from psychological evaluations to (a) usage for control and (b) psychological usage; and from restrictive evaluations to (a) usage for schedule management, (b) usage for relationship maintenance, and (c) psychological usage. The results potentially indicated that for Chinese people, evaluations for relational usage penetrate more aspects of mobile phone use. Possibly, relationship maintenance behavior is incorporated more into people's everyday agenda and is motivated more by their needs for environmental surveillance and accessibility in the Chinese context, given the emphasis on social connections by collectivistic cultures. The perceived usefulness of mobile phones as a tool for relationship maintenance reinforces its symbolic usage for socializing, which means Chinese people convey social messages by mobile phone usage not only to

the social environment in general but also to their significant others. Such messages can encompass both identity display and relational messages (e.g., importance, closeness, intimacy).

That Chinese people's collectivism and interdependence emphasizes the social environment more could be a reason behind the association between psychological importance and usage for control. Indeed, in past work the fear of missing out was greater among Asians than Americans (Karimkhan, & Chapa, 2021), so the importance of mobile phones might have been boosted by their stronger desires to stay in the loop through mobile phone use. The absence of the predicted association between psychological evaluations and psychological usage in the US sample could be explained by habitual attachment: living in a more tech-savvy environment than Chinese participants, American participants might have been psychologically attached to their mobile phones regardless of how they evaluated such attachment.

It was particularly interesting that restrictive evaluations positively predicted usage for relationship maintenance and daily schedule management in the Chinese context, which contradicted the model. This implies the more costly Chinese participants perceived mobile phones usage to be, the more they used it for relationship maintenance and daily schedule management, which distinguished them from American participants. The logic behind this finding might be that the more financial, technical, temporal, or cognitive difficulties Chinese people perceived, the more they perceived mobile phones usage to be a form of privilege or luxury. As reflected by Aricat et al. (2015), even though mobile phones and mobile services were considered expensive, many migrant workers still chose to use them because such use could not only display their financial resources but also boost their social status as they were treated as technical experts with respect in the community. In the same sense, Chinese participants who

perceived more restrictions and barriers might have paradoxically increased their usage as a means to gain both social respect and relational communication with their significant others. Therefore, it is important to consider the inverse relationship identified between affordability and functional usage when examining mobile phone appropriation under the Chinese context.

The US sample also contained some paths that were missing from the Chinese sample: (a) from social evaluations to functional usage for relationship maintenance and (b) from restrictive evaluations to usage for control. The reason why this proposed relationship between social evaluations and relational usage was not observed in the Chinese sample was potentially due to social evaluations being constructed with individualistic values. The items from the subscale emphasized uniqueness and independence, which deviates from the collectivistic self-construal of harmony and interdependence (Markus & Kitayama, 1991). To pursue cross-cultural applicability, the may need to be revised to reflect more universal values accompanying mobile phone appropriation. Moreover, the absent path from restrictive evaluations to usage for control in the Chinese sample may be explained by the fact that using mobile phones for control is less of a social display in general. Because staying reachable (accessibility) is less socially observable as a constant state than calling friends (relationship maintenance) as an episodic activity, the paradox between affordability and usage may be less salient in mobile usage for control.

Besides, the analysis revealed several negative relationships supported by the Chinese sample, which were positive in the US sample: between the functional evaluations of connection and control and functional usage for distraction/pastime, between social evaluations and usage for control, as well as between psychological evaluations and (a) usage for daily schedule management and (b) social symbolic usage. The negative association between the functional evaluations of connection/control and distraction/pastime usage in the Chinese sample may reflect the particularly negative connotations for distracted usage under the cultural context. Chinese users who valued functions of relational maintenance and control might have considered themselves to be *serious users*, which made them despise usage for distraction and entertainment and perceive such uses to be frivolous. Therefore, the more importance they attached to the pragmatic value of mobile phones, the less they used them to kill time. That the Chinese data revealed a negative association between social evaluations and usage for control may be explained by the similar division that Chinese people draw between *serious users* and *non-serious users* and the notion that control usage is less observable in the public sphere. The less they considered mobile phones to be objects for social display, the more they pursued pragmatic uses of mobile phones for accessibility, and vice versa.

By contrast, there were two paths with positive valence in the Chinese sample but negative valence in the US sample: (a) the functional evaluations on organization of daily lives and social aspect of usage, and (b) psychological evaluations to usage for distraction/pastime. The first difference indicates the more US participants valued mobile phones for facilitating management of daily activities, the less they used them for social display. One reason for this phenomenon could arguably be that Americans draw more clear boundaries between the *professional* and the *personal* when it comes to technology usage than Chinese people (Caporael & Xie, 2003). Because of this, the more US participants considered mobile phones to be a tool for (work) schedule management, the less they were willing to use it symbolically for identity or status display.

As for the negative path from psychological evaluations to distraction/pastime, one candidate explanation is that distraction/pastime usage is socially stigmatized so there were more errors in self-reporting caused by social desirability bias and cognitive dissonance. American participants

might not have been very honest about how often they used mobile phones for distraction/pastime because of their perception of those negative images associated with it. Another possibility is that usage for distraction/pastime has become so common that people habitually kill time with mobile phones usage, no matter what they think of psychological attachment (similar to how people keep smoking or driving inefficient vehicles, despite knowing the risks or harms). In this case, they may play with mobile phones due to habits and customs even if they deem psychological attachment to be undesirable. Under either condition, these dynamics require further exploration.

Last, there were four paths with significantly different magnitude across the two samples. The path from metacommunication to the psychological evaluations was stronger for American participants than for the Chinese, indicating that Americans may communicate more about mobile communication interpersonally, through mass media, or by observation of others, and this active metacommunication aligns with their psychological evaluations more. It was also observed that metacommunication better predicted restrictive evaluations in the US sample, and our guess is that Chinese people prefer not to talk about restrictions as much interpersonally and that it is not discussed as often by mass media, given the social implications attached to it. Acknowledging ignorance or inability may be more embarrassing and face-threatening for Chinese users. Another guess is that because Chinese people recognize the symbolic values of mobile phones, they tend to disregard metacommunication concerning use restrictions and believe the claims to be less relevant relying more on their own experience to form their perspectives.

Next, the path from psychological evaluations to relational usage was found to be stronger in the Chinese participants, potentially because their psychological attachment to social networks (Shi & Wang, 2011) was a bigger part of their attachment to mobile phones, under the collectivistic appropriation of mobile phones (Arpaci, 2019; Holmes et al., 2015; Yoon, 2003).

Limitations and Future Directions

One limitation of the present study is that the data was collected in 2016, and mobile technology has greatly advanced since then. Thus, future studies may scrutinize how mobile phone appropriation has evolved over the years including its usage for health aspects (e.g., walking, heart rate, connection with smart watches) and short form videos consumption (e.g., TikTok and Instagram Reels). Another limitation is that two dimensions (i.e., functional evaluations on distraction/pastime and normative evaluations) were dropped from the model testing, which inhibited some of the initial hypotheses and comparisons. Furthermore, the causality of the hypothesized relationships could not be determined with our cross-sectional data. Additionally, self-report data might have increased measurement errors especially for dimensions of usage behavior. Future researchers should improve ways to capture mobile users' actual behavior, not based on their recall or perception. The data will be more accurate and reliable if collected directly from tracking mobile devices instead of self-reporting (Kobayashi & Boase, 2012).

CONCLUSION

In conclusion, the MPA model provides a useful framework for examining the complex reality of mobile phone appropriation, and most of the proposed relationships were supported under different cultural contexts (i.e., the US and China). Although the kernel logic of MPA (i.e., *metacommunication-evaluations-usage*) seemed to be tenable, the MGCFA results suggested potential avenues for model revisions, and a more parsimonious model

can be attained given many subdimensions overlapped. Further comparisons between the Chinese and US samples indicated the social contexts were more influential in Chinese people's MPA, and socio-cultural differences greatly shaped how people understood different usage purposes. The analysis also revealed an interesting paradox between affordability and usage, given the social implications of mobile phones in the Chinese context. Overall, more unexpected paths were found in the Chinese model, indicating that Chinese people's MPA deviated more from the hypothesized model, initially developed in the German context, than Americans'. Therefore, more research efforts are needed to illuminate how highly distinct cultural contexts of mobile phone appropriation impact metacommunication, evaluations, and usage of mobile phones.

REFERENCES

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control* (pp. 11–39). Heidelberg.

Ang, P. H., & Zhou, W. (2023). The long game in Asian communication research. *Asian Communication Research, 20*(1), 5–13.

Aricat, R. G., Karnowski, V., & Chib, A. (2015). Mobile phone appropriation and migrant acculturation: A case study of an Indian community in Singapore. *International Journal of Communication, 9*(22), 2221–2242.

Arpaci, I. (2019). Culture and nomophobia: The role of vertical versus horizontal collectivism in predicting nomophobia. *Information Development, 35*(1), 96–106. https://doi.org/10.1177/026666691773011

Bayer, J. B., Campbell, S. W., & Ling, R. (2016). Connection cues: Activating the norms and habits of social connectedness. *Communication Theory, 26*, 128–149.

https://doi.org/10.1111/comt.12090

Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. Guilford.

Campbell, S. W. (2007). A cross-cultural comparison of perceptions and uses of mobile telephony. *New Media & Society, 9*(2), 343–363. https://doi.org/10.1177/1461444807075016

Caporael, L. R., & Xie, B. (2003). Breaking time and place: Mobile technologies and reconstituted identities. In J. Katz (Ed.), *Machines that become us: The social context of communication technology* (pp. 219–232). Routledge.

China Internet Watch. (2021). *Chinese time spent on smartphone up 15% in 2021*. https://www.chinainternetwatch.com/32047/media-time-spend/

Coyne, S. M., Stockdale, L., & Summers, K. (2019). Problematic cell phone use, depression, anxiety, and self-regulation: Evidence from a three year longitudinal study from adolescence to emerging adulthood. *Computers in Human Behavior, 96*, 78–84. https://doi.org/10.1016/j.chb.2019.02.014

Cui, Y., Chipchase, J., & Ichikawa, F. (2007). A cross culture study on phone carrying and physical personalization. In N. Aykin (Ed.), *International conference on usability and internationalization* (pp. 483–492). Heidelberg.

DataReportal (2021). *Digital around the world*. https://datareportal.com/global-digital-overview

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*, 319–340. https://doi.org/10.2307/249008

Derks, D., & Bakker, A. B. (2014). Smartphone use, work–home interference, and burnout: A diary study on the role of recovery. *Applied Psychology, 63*(3), 411–440. https://doi.org/10.1111/j.1464-0597.2012.00530.x

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization Science, 5*(2), 121–147. https://doi.org/10.1287/orsc.5.2.121

DeVellis, R. F. (2016). *Scale development: Theory and applications*. Sage.

Dourish, P. (2003). The appropriation of interactive technologies: Some lessons from placeless documents. *Computer Supported Cooperative Work, 12*(4), 465–490. https://doi.org/10.1023/A:1026149119426

Exelmans, L., & Van den Bulck, J. (2016). Bedtime mobile phone use and sleep in adults. *Social Science & Medicine, 148*, 93–101. https://doi.org/10.1016/j.socscimed.2015.11.037

Faqih, K. M. S., & Jaradat, M. I. R. M. (2015). Assessing the moderating effect of gender differences and individualism-collectivism at individual-level on the adoption of mobile commerce technology: TAM3 perspective. *Journal of Retailing and Consumer Services, 22*, 37–52. https://doi.org/10.1016/j.jretconser.2014.09.006

Goggin, G. (2008). *Mobile phone cultures*. Routledge.

Hoang, M. (2015). *The impacts of individualism/collectivism on consumer decision-making styles: The case of Finnish and Vietnamese mobile phone buyers* [Bachelor's thesis]. Turku University of Applied Sciences, Turku, Finland. https://urn.fi/URN:NBN:fi:amk-2015121721200

Höflich, J. R. (2003). Part of two frames: Mobile communication and the situational arrangement of communicative behavior. In N. Kritóf (Ed.), *Mobile democracy: Essays on society, self and politics* (pp. 33–53). Passagen Verlag.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Sage.

Holmes, K., Balnaves, M., & Wang, Y. (2015). Red Bags and WeChat (Wēixìn): Online collectivism during massive Chinese cultural events. *Global Media Journal: Australian Edition, 9*(1), 15–26.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Humphreys, L., Von Pape, T., & Karnowski, V. (2013). Evolving mobile media: Uses and conceptualizations of the mobile internet. *Journal of Computer-Mediated Communication, 18*(4), 491–507. https://doi.org/10.1111/jcc4.12019

Karimkhan, F., & Chapa, S. (2021). Is fear of missing out (FOMO) a cultural construct? Investigating FOMO from a marketing perspective. *Journal of Cultural Marketing Strategy, 5*(2), 169–183.

Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *The Public Opinion Quarterly, 37*(4), 509–523. https://doi.org/10.1086/268109

Katz, J. E., & Aakhus, M. (2002). Introduction: Framing the issues. In J. E. Katz & M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 1–14). Cambridge University Press.

Katz, J. E., Aakhus, M. A., Kim, H. D., & Turner, M. (2003). Cross-cultural comparison of ICTs. In L. Fortunati, J. Katz, & R. Riccini (Eds.), *Mediating the human body: Technology, communication and fashion* (pp. 75–86). Lawrence Erlbaum.

Khattab, I., & Love, S. (2009). Understanding the impact of culture on mobile phone usage on public places: A comparison between the UK and Sudan. In P. Zaphiris & C. S. Ang (Eds.), *Cross-disciplinary advances in human computer interaction: User modeling, social computing, and adaptive interfaces* (pp. 70–89). IGI Global.

Kim, Y., Kim, B., Kim, Y., & Wang, Y. (2017). Mobile communication research in communication journals from 1999 to 2014. *New Media & Society*, *19*(10), 1668–1691. https://doi.org/10.1177/1461444817718162

Kobayashi, T., & Boase, J. (2012). No such effect? The implications of measurement error in self-report measures of mobile communication use. *Communication Methods and Measures, 6*(2), 126–143. https://doi.org/10.1080/19312458.2012.679243

Kühne, R. (2013). Testing measurement invariance in media psychological research. *Journal of Media Psychology, 25*(4).153–159. https://doi.org/10.1027/1864-1105/a000096

Lee, S., & Cionea, I. (2023). A test of the mobile phone appropriation model. *Western Journal of Communication*. Advance online publication. https://doi.org/10.1080/10570314.2022.2158687

Lee, S. -G., Trimi, S., & Kim, C. (2013). The impact of cultural differences on technology adoption. *Journal of World Business*, *48*(1), 20–29. https://doi.org/10.1016/j.jwb.2012.06.003

Lee, S. K., Karnowski, V., von Pape, T., & Cionea, I. A. (2016). An English scale for measuring mobile phone appropriation: Translation and assessment. *SCM Studies in Communication and Media*, *5*(4), 397–426. https://doi.org/10.5771/2192-4007-2016-4-397

Lee, Y., Kim, J., Lee, I., & Kim, H. (2002). A cross-cultural study on the value structure of mobile internet usage: Comparison between Korea and Japan. *Journal of Electronic Commerce Research*, *3*(4), 227–239.

Leonardi, P. M. (2013). Theoretical foundations for the study of sociomateriality. *Information and Organization*, *23*(2), 59–76. https://doi.org/10.1016/j.infoandorg.2013.02.002

Lepp, A., Barkley, J. E., Sanders, G. J., Rebold, M., & Gates, P. (2013). The relationship between cell phone use, physical and sedentary activity, and cardiorespiratory fitness in a sample of US college students. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 1–9. https://doi.org/10.1186/1479-5868-10-79

Ling, R. (2012). *Taken for grantedness: The embedding of mobile communication into society*. MIT Press.

Liu, J. (2020). *Shifting dynamics of contention in the digital age: Mobile communication and politics in China*. Oxford University Press.

Mante, E. (2002). The Netherlands and the USA compared. In J. Katz & M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 110–125). Cambridge University Press.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224–253. https://doi.org/10.1037/0033-295X.98.2.224

Meng, L., & Kim, S. -Y. (2020). Young Cambodian consumers' perceptions of corporate social responsibility: Applications of collectivism, saving face, and Buddhism. *Asian Communication Research, 17*(3), 84–114.

Moshagen, M., & Auerswald, M. (2018). On congruence and incongruence of measures of fit in structural equation modeling. *Psychological Methods*, *23*(2), 318–336. https://dio.org/10.1037/met0000122

O'Dea, S. (2021). *Daily time spent on mobile phones in the United States. 2019–2023*. https://www.statista.com/statistics/1045353/mobile-device-daily-usage-time-in-the-us/

Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science*, *3*(3), 398–427. https://doi.org/10.1287/orsc.3.3.398

O'Sullivan, P. B., & Carr, C. T. (2018). Masspersonal communication: A model bridging the mass-interpersonal divide. *New*

Media & Society, 20(3), 1161–1180. https://doi.org/10.1177/1461444816686104

Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin, 128*(1), 3–72. https://doi.org/10.1037/0033-2909.128.1.3

Peltonen, E., Lagerspetz, E., Hamberg, J., Mehrotra, A., Musolesi, M., Nurmi, P., & Tarkoma, S. (2018). The hidden image of mobile apps: Geographic, demographic, and cultural factors in mobile usage. *MobileHCI '18: Proceedings of the 20th International Conference on Human-Computer Interaction with Mobile Devices and Services* (pp. 1–12). ACM. https://doi.org/10.1145/3229434.3229474

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review, 41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Qiu, J. L. (2010). Mobile communication research in Asia: Changing technological and intellectual geopolitics? *Asian Journal of Communication, 20*(2), 213–229. https://doi.org/10.1080/ 01292981003693393

Rogers, E. (2003). *Diffusion of innovations* (5th ed.). Simon & Schuster.

Rosseel, Y. (2012). *R package lavaan 0.6-14* [Computer software]. https://lavaan.ugent.be/

Rutkowski, L., & Svetina, D. (2014). Assessing the hypothesis of measurement invariance in the context of large-scale international surveys. *Educational and Psychological Measurement, 74*(1), 31–57. https://doi.org/10.1177/0013164413498257

Schrock, A. R. (2015). Communicative affordances of mobile media: Portability, availability, locatability, and multimediality. *International Journal of Communication, 9*(18), 1229–1246.

Shi, X., & Wang, J. (2011). Cultural distance between China and US across GLOBE model and Hofstede model. *International Business and Management, 2*(1), 11–17.

Shuter, R. (2012). Intercultural new media studies: The next frontier in intercultural communication. *Journal of Intercultural Communication Research, 41*(3), 219–237. https://doi.org/10.1080/17475759.2012.728 761

Shuter, R., & Chattopadhyay, S. (2014). A cross-national study of cultural values and contextual norms of mobile phone activity. *Journal of Multicultural Discourses, 9*(1), 61–70. https://doi.org/10.1080/17447143.2013.859 262

Silverstone, R., & Haddon, L. (1996). Design and the domestication of information and communication technologies: Technical change and everyday life. In R. Mansell & R. Silverstone (Eds.), *Communication by design: The politics of information and communication technologies* (pp. 44–74). Oxford University Press.

Stump, R. L., Gong, W., & Li, Z. (2008). Exploring the digital divide in mobile-phone adoption levels across countries: Do population socioeconomic traits operate in the same manner as their individual-level demographic counterparts? *Journal of Macromarketing, 28*(4), 397–412. https://doi.org/10.1177/0276146708325386

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Allyn and Bacon.

Thomée, S. (2018). Mobile phone use and mental health. A review of the research that takes a psychological perspective on exposure. *International Journal of Environmental Research and Public Health, 15*(12), 2692. https://doi.org/10.3390/ijerph15122692

Van Biljon, J., & Kotzé, P. (2008). Cultural factors in a mobile phone adoption and usage model. *Journal of Universal Computer Science, 14*(16),

2650–2679.

Vimalkumar, M., Singh, J. B., & Sharma, S. K. (2020). Exploring the multi-level digital divide in mobile phone adoption: A comparison of developing nations. *Information Systems Frontiers, 23*(3), 1–20.
https://doi.org/10.1007/s10796-020-10032-5

Wei, R., Fan, J., & Liu, J. (2022). Mobile communication research in 15 top-tier journals, 2006-2020: An updated review of trends, advances, and characteristics. *Mobile Media & Communication*. Advance online publication.
https://doi.org/10.1177/20501579221110324

Wirth, W., Karnowski, V., & von Pape, T. (2007). How to measure appropriation? Towards an integrative model of mobile phone appropriation. In T. Hess (Ed.), *Ubiquität, Interaktivität, Konvergenz und die Medienbranche: Ergebnisse des interdisziplinären Forschungsprojektes intermedia* (pp. 93–105). Universitätsverlag Göttingen.

Wirth, W., Von Pape, T., & Karnowski, V. (2008). An integrative model of mobile phone appropriation. *Journal of Computer-Mediated Communication, 13*(3), 593–617.
https://doi.org/10.1111/j.1083-6101.2008.00412.x

Worthington, D., Fitch-Hauser, M., Välikoski, T.-R., Imhof, M., & Kim, S. -H. (2012). Listening and privacy management in mobile phone conversations: Cross-cultural comparison of Finnish, German, Korean and United States students. *Empedocles: European Journal for the Philosophy of Communication, 3*(1), 43–60.
https://doi.org/10.1386/ejpc.3.1.43_1

Wurmser, Y. (2019). *US time spent with mobile 2019: Smartphones gain minutes, but new challengers emerge.*
https://www.emarketer.com/content/us-time-spent-with-mobile-2019

Yoon, K. (2003). Retraditionalizing the mobile: Young people's sociality and mobile phone use. *European Journal of Cultural Studies, 6*(3),

327–343.
https://doi.org/10.1177/13675494030063004

Appendix A
Initial Scale Reliability Scores in the Chinese Sample

Variable	M	Item variances	Cronbach's alpha
Metacommunication (MC)			
Metacommunication—interpersonal (MCIP)	2.89	0.95	.88
Metacommunication—mass media (MCMC)	2.84	1.14	.90
Metacommunication—observational (MCOB)	2.92	1.03	.89
Functional evaluations (FE)			
Functional evaluations—distraction (FEDIS)	3.47	1.02	.53
Functional evaluations—organization (FEORG)	3.63	0.79	.73
Functional evaluation—stay connected (FECONN)	3.95	0.66	.81
Functional evaluation—control (FECONT)	3.66	0.88	.79
Symbolic evaluations (SE)			
Symbolic evaluations—social (SESO)	3.36	0.99	.75
Symbolic evaluations—psychological (SEPS)	3.47	1.32	.83
Normative evaluations (NE)	3.55	0.90	.87
Restrictive evaluations (RE)	2.87	1.53	.70
Functional aspects (FA)			
Functional aspects—control (FAC)	4.08	0.68	.93
Functional aspects—distraction (FAD)	3.39	3.12	.93
Functional aspects—management (FAM)	3.08	1.30	.92
Functional aspects—relationship (FAR)	3.57	0.82	.76
Symbolic aspects (SA)			
Symbolic aspects - social (SASO)	2.47	1.60	.80
Symbolic aspects - psychological (SAPS)	3.64	0.94	.82

Appendix A
Initial Scale Reliability Scores in the U.S. Sample

Variable	M	Item variances	Cronbach's alpha
Metacommunication (MC)			
Metacommunication—interpersonal (MCIP)	2.76	1.54	.92
Metacommunication—mass media (MCMC)	2.65	1.65	.92
Metacommunication—observational (MCOB)	2.86	1.54	.92
Functional evaluations (FE)			
Functional evaluations—distraction (FEDIS)	3.30	1.13	.70
Functional evaluations—organization (FEORG)	3.83	0.88	.81
Functional evaluation—stay connected (FECONN)	3.81	1.00	.83
Functional evaluation—control (FECONT)	3.69	1.14	.78
Symbolic evaluations (SE)			
Symbolic evaluations—social (SESO)	3.34	1.25	.78
Symbolic evaluations—psychological (SEPS)	3.98	0.69	.84
Normative evaluations (NE)	3.48	1.17	.83
Restrictive evaluations (RE)	2.83	1.63	.83
Functional aspects (FA)			
Functional aspects—control (FAC)	3.98	1.05	.91
Functional aspects—distraction (FAD)	3.51	1.51	.95
Functional aspects—management (FAM)	3.42	1.65	.90
Functional aspects—relationship (FAR)	3.41	1.51	.86
Symbolic aspects (SA)			
Symbolic aspects - social (SASO)	2.64	1.81	.90
Symbolic aspects - psychological (SAPS)	3.65	1.34	.88

Appendix A
Final Scale Reliability Scores in the Chinese Sample

Variable	M	Item variances	Cronbach's alpha
Metacommunication (MC)	2.89	1.04	.96
Functional evaluations—organization (FEORG)	3.63	0.79	.73
Functional evaluation—stay connected/control (FECONN/FECONT)	3.80	0.77	.87
Symbolic evaluations—social (SESO)	3.35	0.99	.71
Symbolic evaluations—psychological (SEPS)	4.05	0.69	.79
Restrictive evaluations (RE)	2.82	1.59	.71
Functional aspects—control (FAC)	4.08	0.68	.93
Functional aspects—distraction (FAD)	3.39	3.12	.93
Functional aspects—management (FAM)	3.08	1.30	.92
Functional aspects—relationship (FAR)	3.76	0.62	.87
Symbolic aspects - social (SASO)	2.29	1.71	.84
Symbolic aspects - psychological (SAPS)	3.75	0.89	-

Appendix A
Final Scale Reliability Scores in the U.S. Sample

Variable	M	Item Variances	Cronbach's alpha
Metacommunication (MC)	2.76	1.58	.97
Functional evaluations—organization (FEORG)	3.83	0.88	.81
Functional evaluation—stay connected/control (FECONN/FECONT)	3.75	1.07	.88
Symbolic evaluations—social (SESO)	3.17	1.39	.78
Symbolic evaluations—psychological (SEPS)	3.14	1.51	.86
Restrictive evaluations (RE)	2.85	1.50	.80
Functional aspects—control (FAC)	3.98	1.05	.91
Functional aspects—distraction (FAD)	3.51	1.51	.95
Functional aspects—management (FAM)	3.42	1.65	.90
Functional aspects—relationship (FAR)	3.60	1.33	.88
Symbolic aspects—social (SASO)	2.56	1.86	.90
Symbolic aspects—psychological (SAPS)	3.64	1.42	-

Appendix B
Chinese and English MPA Scale (89 Items)

Label	Chinese item	English item
MCIP1	你是否经常与他人讨论手机的外观？	Do you often talk about the appearance of cellphones with others?
MCIP2	你是否经常与他人讨论手机上新的应用软件（app）？	Do you often talk about new apps [available] in cellphones with others?
MCIP3	你是否经常与他人讨论你手机上的功能？	Do you often talk about functions of [your] cellphones with others?
MCIP4	你是否经常与他人讨论手机放置的位置（如挂在皮带上、在包里等）	Do you often talk about places of storing cellphones with others (hang on the belt, put in the bag)
MCIP5	你是否经常与他人讨论那些炫耀他们手机的人？	Do you often talk about those who often show off their cell phones to others?
MCMC1	你是否经常注意到电影中的女主角或男主角使用新型号的手机？	How often do you realize that an actress/actor in a movie is using a new stylish mobile phone?
MCMC2	你是否经常通过广告了解新款手机具有的新功能或新应用？	Do you often learn about new mobile phone applications or functions through advertisements?
MCMC3	你是否经常通过报纸或电视了解新款手机具有的功能或应用？	Do you often learn about the latest functions [or applications] of a cellphone by reading newspapers or watching TV?
MCMC4	当电影中出现男／女主角在不适宜的情境下使用手机时，你是否经常会联系到自己？	How often do you think to yourself while watching a movie that the actress/actor on screen should not be using their cellphones in certain situations on screen?
MCMC5	你是否经常注意到电影中的男／女主角常常通过手机约定见面或聚会？	How often do you realize that the leading roles in the movie often organize appointments or gatherings by using mobile phones?
MCOB1	你是否经常注意到你认识的人在使用新款的手机？	How often do you realize that someone you know use the latest cell phone?
MCOB2	你是否经常注意到身边的人在使用一项你从未使用过的手机功能？	DO you often notice that someone around you use the functions that you have never used on the cell phone?
MCOB3	你是否经常注意到身边的人在使用最新款的手机？	Do you often notice someone around you to use the latest cell phone?
MCOB4	你是否经常注意到别人在忙得不可开交时使用手机约定见面或聚会？	Do you often notice that someone on the go is using their cell phone to make appointments or gatherings?
MCOB5	你是否经常注意到别人把手机收起来（放回口袋、钱包或包里）？	How often do you pay attention when someone puts their mobile phone away (in their pocket, in their bag/purse…)?
MCOB6	你是否经常注意到别人在公共场合关掉手机（电影，公共交通）？	How often do you notice when someone around you turn off their mobile phones in a public setting (e.g., movie theater, public transportation)

Appendix B
Chinese and English MPA Scale (89 Items)

Label	Chinese item	English item
FEDIS1	对我而言，日常生活中留有开小差的时间很重要。	It is important to me that my daily routine allows times for distraction.
FEDIS2	从来不觉得无聊对我来说很重要。	It's important to me that I am never bored.
FEDIS3	我总是找一些事情来充实我的时间，这一点对我来说很重要。	It is important to me that I constantly seek out things to fill my time.
FEDIS4	平时不浪费时间，这一点对我来说很重要。	It is important to me that I do not waste my time with anything during the day.
FEORG1	对我而言，时刻能够保证约会与联系很重要。	It is important to me to always have my appointments and contacts in check
FEORG2	对我而言，日常安排具有一定灵活性很重要	It is important to me that my daily routine can be flexibly organized.
FEORG3	对我而言，有一份设定好的日程很重要。	It is important to me that I have an organized schedule.
FEORG4	对我而言，能够尽快地适应日程上的变动很重要。	It is important to me that I adapt to any change of schedules quickly enough.
FECONN1	随时获悉那些对我而言重要的人的现状很重要。	It is important to me to always know what is going on with my significant others.
FECONN2	与朋友们随时保持联系对我很重要。	It's important to me to always stay in touch with friends.
FECONN3	知道我的朋友和家人过得好不好，这对我而言很重要	It is important for me to know how well my friends and family are doing.
FECONN4	随时与家人保持联系，这对我而言很重要。	It is important to me to always keep in touch with my family members.
FECONT1	对我而言，随时随地可以找到我很重要。	It is important to me to always be reachable, whenever and wherever.
FECONT2	对我而言，随时关注身边发生的事情很重要。	For me, it's important to be aware of what is going on around me.
FECONT3	对我而言，能够控制身边的事情很重要。	It is important for me to be in control of my surroundings.
FECONT4	对我而言，随时随地可以联系到我很重要。	It is important for me to be available 24/7.
SESO1	我认为，手机能够把我从尴尬的情景中解救出来（如，通过电话）是一件好事。	I think [it is good] that with a mobile phone one has the ability to pull back from uncomfortable situations (for example, by pretending to answer a phone call).
SESO2	因为手机，一个人变得独立，我认为这是一件好事。	I think it is good that one can be independent thanks to their mobile phone(s).
SESO3	在我看来，在公众面前通过所使用的产品体现自己的个性，这一点很重要。	I think it is important that I can present myself in public with my accessories.
SESO4	我们能够通过一个人所使用的产品辨识出她／他是怎么样的人及其价值观。	From a mobile phone's accessories, such as its cover and decorations, one can tell what kind of person the owner is and what values s/he has.

Appendix B
Chinese and English MPA Scale (89 Items)

Label	Chinese item	English item
SEPS1	对我而言，所使用的产品适合我是一件很重要的事情。	It is important to me that my accessories match me.
SEPS2	对我而言，喜欢我所使用的技术这一点很重要。	For me, it's important to like the technology I use.
SEPS3	对我而言，拥有良好品质的产品很重要	It is important to me that I own nice accessories.
SEPS4	对我而言，具有一定经济实力很重要。	For me, it's important that I can afford expensive things.
SEPS5	随时带着手机对我而言很重要。	It's important to me to always have my cell phone with me.
NE1	今天，可以料想的是，如果计划有所变动，应该可以通过手机联络上任何一个人。	Nowadays, it is expected that when plans change, an individual must be flexibly reachable on their mobile phones.
NE2	当你与别人商定计划时，可以料想到的是，人们总是会带着他们的手机，以便讨论见面地点。	When making plans with others, it is expected that people always have their cell phones with them to be able to discuss where to meet.
NE3	在我的朋友圈里，每一个人都很依赖于手机以便确保自己融入这个圈子。	In my circle of friends, one is very dependent on their mobile phone in order to be included in the group.
NE4	我最亲密的朋友都期待我通过手机与他们保持联系。	My closest friends expect me to keep them in the loop with my mobile communication.
NE5	如果一个人很长时间不通过手机与他人联系，其他人可能认为这种行为是有所指。	When one doesn't keep in touch with their mobile phones for quite some time, it can happen that others will take it personally.
NE6	什么事情可以通过手机沟通，什么又是必须当面沟通的，这有明确的界限。	There are norms regarding what kinds of things can be said over the phones and things that should better be said in person.
NE7	今天，人们会关注你使用什么型号的手机以及其外观。	Nowadays, people notice what kind of phone you use and what it looks like.
NE8	使用什么型号的手机以及如何装饰手机给我们带来正面或负面的评价。	Based on what kind of cellphone and the way it is decorated, one can receive positive or negative reactions from others.
NE9	炫耀酷炫的手机可能使你受到嘲笑。	Showing off a cool mobile phone can get you laughed at.
NE10	如果你不希望自己的手机引人注目时，你应当留心何时何地使用手机。	When someone does not want to be noticed with a certain mobile phone, they should pay attention to where and when they are using it.
NE11	对于何时何地应该或不应该使用手机有明确的规范。	There are clear norms regarding where and when one should use a mobile phone and in which situations they should not.
NE12	当你一味地埋头玩手机，这种行为会让其他人觉得讨厌。	When you are on the go and playing with your mobile phone(s), others can feel bothered by it.
NE13	当某个人炫耀自己的手机时，他们很有可能是没有什么其它值得炫耀的东西。	When somebody is proud of their mobile phone, they most likely have nothing better they can be proud of.
NE14	如今，雇员在工作时间以外仍被期待会回复电话和短信。	Nowadays, even after work hours, employees are expected to respond to employers' phone calls or text messages through mobile phones.

Appendix B
Chinese and English MPA Scale (89 Items)

Label	Chinese item	English item
RE1	对我而言，经常用手机套餐来打电话太贵了。	Mobile phone plans are too expensive to make phone calls frequently with them.
RE2	对我而言，要使用遍手机上提供的所有功能太复杂了。	Mobile phones are too complicated to use for everything they have to offer.
RE3	我希望使用某些功能，但是我的手机太老了，所以不具备这些功能。	There are functions I would like to use but are not available in my mobile phone because it is too old.
RE4	你需要花很多时间才能完全学会手机上的功能并使用它。	You would need a lot more time to be able to learn fully what functions a mobile phone has to offer and be able to operate it.
FAC1	通常情况下我会随身带着手机，以确保紧急情况发生时别人能找到我。	I always have my cellphone with me to be reachable in case of emergencies.
FAC2	通常情况下我会随身带着手机，以确保紧急情况时可以打电话求助。	I always have my cellphone with me to be able to call for help in emergencies.
FAC3	通常情况下我会随身带着手机，以便与家人随时联系。	I always have my cellphone with me to be able to reach my family all the time.
FAC4	通常情况下我会随身带着手机，以便与朋友随时联系。	I always have my cellphone with me to be able to reach my friends all the time.
FAC5	通常情况下我会随身带着手机，以便家人与我随时联系。	I always have my cellphone with me so that my family can reach me all the time.
FAC6	通常情况下我会随身带着手机，以便朋友与我随时联系。	I always have my cellphone with me so that my friends can reach me all the time.
FAD1	我玩手机以打发时间。	I use my phone to kill time.
FAD2	手机是我的一种消遣方式。	I use my phone for distraction.
FAD3	我用手机娱乐。	I use my cell phone for entertainment.
FAD4	没什么事情好做的时候，我会玩手机。	I use my phone as something to do when there is nothing to do.
FAD5	当我觉得无聊的时候，我会玩手机。	I use my phone when I am bored.
FAD6	无所事事的时候我就玩手机。	I use my phone when there's nothing better to do.
FAM1	我使用手机来安排每天行程。	I use my phone to set up my daily schedule.
FAM2	我使用手机来有序安排我的行程、联系人以及需要完成的事情。	I use my phone to keep my schedule, my contacts and my responsibilities in order.
FAM3	我使用手机来安排工作相关的会见。	I use phone to coordinate work-related appointments.
FAM4	我使用手机来安排与朋友的活动。	I use phone to plan activities with my friends.
FAM5	我使用手机来规划家庭活动。	I use phone to plan activities with my family.

Appendix B
Chinese and English MPA Scale (89 Items)

Label	Chinese item	English item
FAR1	我使用手机是为了能够时刻与朋友联系。	I use phone to constantly keep in contact with my friends.
FAR2	我使用手机是为了保持远距离恋爱关系。	I use phone to maintain long distance romantic relationships.
FAR3	我使用手机是为了保持与距离远了的朋友的联系。	I use phone to stay in touch with my friends who live far away from me.
FAR4	我使用手机是为了保持与挚友的联系。	I use my phone to always stay connected with my best friends.
FAR5	我使用手机是为了保持与那些经常见面的朋友的联系。	I use my phone to stay in contact with people that I could see face-to-face.
SASO1	手机就像我的衣着与行为举止一样，体现了我是什么样的一种人。	My cell phone shows what kind of a person I am, just as much as my clothing and my demeanor do.
SASO2	有时打电话的时候我会夸夸其谈，这样身边的人都能听到。	Sometimes I catch myself bragging while being on the phone, so that people around me can hear.
SASO3	我会故意把手机放在周围的人都能清楚看到的地方。	I often catch myself leaving my phone well in the sight of the other people around me.
SASO4	当其他人谈论起他们手机时，我愿意告诉他们我有什么样子的手机。	When others speak about their phones, I'd like to tell them what kind of phone I own.
SAPS1	当我把手机遗忘在家里，这种感觉就像缺少了什么一样。	When I forget my mobile phone at home, I feel incomplete.
SAPS2	对我而言，手机是很重要的一部分。	My mobile phone is an important part of me.
SAPS3	手机是我身体的延伸。	My mobile phone is an extension of me.
SAPS4	我喜欢使用我的手机。	I like to use my mobile phone.