

# Willingness to accept (WTA), willingness to pay (WTP), and the WTA/WTP disparity in Chinese social media platforms: Descriptive statistics and associations with personality and social media use

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## ABSTRACT

The amount of money individuals were willing to accept (WTA) to discontinue using prominent Chinese social media platforms (WeChat/QQ), the willingness to pay (WTP) for using these platforms, as well as WTA/WTP disparities were investigated in between-groups and within-subjects design studies to examine their existence, size, and psychological correlates in the form of personality and social media use habits.

Individuals were recruited at Chinese universities in three separate surveys. For between-groups investigations, four samples were investigated: WTA and WTP samples for investigations in the context of WeChat as well as WTA and WTP samples for QQ. For within-subjects investigations, individuals completed items on WTA and WTP for WeChat/QQ, the Big Five Inventory, time spent on WeChat/QQ, and the short Bergen Social Media Addiction Scale. Two samples providing data on WeChat and QQ, respectively, were investigated.

Across study designs and for both WeChat and QQ we found evidence for high WTA and comparatively low WTP scores, thus, large WTA/WTP disparities. Individual differences in the disparities were negatively associated with Openness across social media platforms. The results reveal a generally low acceptance to pay for social media use, which is important against the background of discussions on monetary payment models. Moreover, a complex interplay between individual characteristics, characteristics of the service, and how and why the service is used seems to underly WTA and the WTA/WTP disparity. Finally, methodological implications of the present results for forthcoming studies assessing valuation (WTA, WTP) in the context of social media are discussed.

## 1. Introduction

To investigate the valuation of a product/service, numerous studies have assessed individuals' willingness to pay (WTP) for the product/service, and/or their willingness to accept (WTA; minimum amount of money one needs to be offered to discontinue using/selling the product/service) (Brown & Gregory, 1999; Sunstein, 2020). Strikingly, many studies have observed a discrepancy reflected in higher WTA than WTP scores for the same product/service, also termed the WTA/WTP disparity (Brown & Gregory, 1999; Horowitz & McConnell, 2002; Tunçel & Hammitt, 2014). The existence of this disparity contradicts

classical economic theories (Willig (1976) as cited in Kahneman et al. (1990)). Thus, researchers are keen on understanding what (psychological) mechanisms underly WTA, WTP, and their disparity. For now, however, the underlying psychology of the WTA/WTP disparity remains unknown and a topic of discussions (Brown, 2005; Brown & Gregory, 1999; Morewedge & Giblin, 2015; Morewedge, Shu, Gilbert, & Wilson, 2009; Tunçel & Hammitt, 2014).

Among others, WTA, WTP, and the WTA/WTP disparity have been examined in the context of digital products/services (Fritze, Eisingerich, & Benkenstein, 2019; Sunstein, 2020). Only one work, however, has investigated these variables specifically in the context of social media

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(Sunstein, 2020) and found much larger WTA/WTP disparities than previously reported for other goods (products/services). The examination of WTA, WTP, and the WTA/WTP disparity in the realm of social media is of high interest, because the usage of such platforms constitutes a special context. This is because i) such platforms cannot be owned by an individual user but only be used, ii) usage of the platforms currently is primarily not paid for with money, and iii) social media platforms are an integral part of everyday life for many individuals (We Are Social, Hootsuite, & Datareportal, 2020). Moreover, an investigation of valuation measures (WTA and specifically WTP) of social media platforms is of special interest because monetary payment models as alternatives to the current business model underlying most social media platforms are debated (Sindermann, Kuss, Throuvala, Griffiths, & Montag, 2020).

Based on the peculiarities of the social media context and the large WTA/WTP disparities found in this context before (Sunstein, 2020), we aimed to investigate WTA, WTP, and the WTA/WTP disparity in the context of social media more in-depth. More specifically, our work adds to the literature in two important ways: Firstly, the present work replicates the study design by Sunstein (2020) who investigated Western samples and platforms, by examining Chinese samples and Chinese/Eastern social media platforms. Thereby, this work tests the robustness of previous findings. Not only does this align with the objective to overcome issues of non-replicable findings in psychological research; see problems presented in Open Science Collaboration (2015) and cross-cultural replications as a solution for the replication crisis as discussed in Montag (2018). Additionally, this research approach supports overcoming the WEIRD problem psychological research oftentimes faces: Numerous psychological theories and effects are investigated in Western, Educated, Industrialized, Rich, and Democratic samples only (Henrich, Heine, & Norenzayan, 2010). Secondly, going beyond Sunstein's (2020) work, we aimed at investigating psychological correlates of WTA, WTP, and the WTA/WTP disparity to better understand these variables. For the purpose of understanding psychological correlates of WTA, WTP, and the WTA/WTP disparity, we chose an individual differences approach and examined personality dispositions, time spent on a social media platform, and disordered use of social media. An examination of the psychological correlates, such as personality dispositions, of WTA, WTP, and the WTA/WTP disparity is crucial because Sunstein (2020) in his work discusses potential explanations for the effects he found. However, since no other variables aside from WTA and WTP were assessed in this previous work, explanations remain hypothetical and have not been tested for now.

To follow the above-mentioned aims, Chinese samples were recruited to investigate WTA, WTP, and the WTA/WTP disparity in the context of prominent Chinese social media platforms in between-groups and within-subjects design studies. Results replicate the findings on a large WTA/WTP disparity for social media platforms, which were due to large WTA scores and low - oftentimes 0 Chinese Renminbi (RMB) - WTP scores. Further, individual differences in this disparity were negatively associated with the personality trait Openness across social media platforms. Implications of the present findings for social media platforms and the acceptance of monetary payment models are presented. Further, potential psychological mechanisms contributing to the high WTA scores and the WTA/WTP disparity are introduced. For that purpose, a complex interplay between personal dispositions, characteristics of the good under investigation (here: Social media platforms), and how and why the good is used by individuals is discussed. Finally, the results are contemplated with regard to methodological implications for measuring valuation of social media platforms in future studies.

## 1.1. Review of previous works and theories underlying the present study

### 1.1.1. WTA, WTP, the WTA/WTP disparity, and the endowment effect

The WTA/WTP disparity is often examined in the valuation paradigm (Marzilli Ericson & Fuster, 2014; Morewedge & Giblin, 2015). In this paradigm, individuals in one group are asked about the minimum

amount of money they need to be offered to sell a specific good (WTA) they were endowed with before. Individuals in the other group are asked about the maximum amount they are willing to pay to purchase the same good (WTP), which they were not endowed with before. The ratio of mean/median WTA in one group divided by mean/median WTP in the other group, or the difference between those scores, is investigated as the WTA/WTP disparity.

The WTA/WTP disparity is closely related to the endowment effect. The endowment effect describes the general tendency to value a good (e.g., product or service) more when one owns it. Often, the endowment effect is explained by dependence on a reference point (status quo bias) and loss aversion, both included in prospect theory (Kahneman & Tversky, 1979; Morewedge & Giblin, 2015; Tversky & Kahneman, 1991). The effect has been well-known in economics, law, and psychology for roughly 40 years (Thaler, 1980).

The WTA/WTP disparity is an often-utilized measure of the endowment effect and this effect is one potential explanation for the WTA/WTP disparity. As such, both the WTA/WTP disparity and the endowment effect have been investigated and demonstrated for various physical and non-physical as well as private and public goods (Brown & Gregory, 1999; Horowitz & McConnell, 2002; Kahneman, Knetsch, & Thaler, 1990; Ortona & Scacciati, 1992; Sunstein, 2020). The endowment effect, however, is not the only explanation for the WTA/WTP disparity (among others, also profit motives might play a role; for further explanations see: Brown, 2005; Brown & Gregory, 1999; Dommer & Swaminathan, 2013; Morewedge et al., 2009; Morewedge & Giblin, 2015; Tunçel & Hammitt, 2014). In line with this, there is no consensus on psychological mechanisms underlying and explaining the WTA/WTP disparity. Putatively individual factors, such as personality traits, characteristics of the good, and contextual factors are of importance.

### 1.1.2. WTA, WTP, and the WTA/WTP disparity in the context of social media platforms

Digital goods, and more specifically the usage of social media platforms, are a special kind of "goods" in the research field on WTA, WTP, and the WTA/WTP disparity. This particularity is due to the above-mentioned reasons that one can, for example, only use but (usually) not own social media services.

In this regard the work by Sunstein (2020) already mentioned above is of considerable importance. In that study, the amount of money individuals were willing to accept to discontinue using the platform (WTA) was much higher than the amount they were willing to pay for platform use (WTP). With a ratio of roughly up to 20:1 across platforms, the WTA/WTP disparity found for social media platforms was quite large and, hence, called a "superendowment effect" in the previous work (Sunstein, 2020).

Based on these findings, the first aim of the present study was to test the robustness of findings and expand results on the WTA/WTP disparity to other popular social media platforms. Specifically, we were interested in investigating platforms widely used in more Eastern countries like China, where platforms like Facebook are not available. In detail, we were interested in the platforms WeChat and QQ (Tencent Holding Ltd.)<sup>1</sup> (We Are Social & Hootsuite, 2020). WeChat is a multipurpose social media application commonly used in Asian countries such as China (We Are Social & Hootsuite, 2020). It combines instant messaging services with classical social network functions. The latter include the possibility to create one's own profile, a personal news feed, and possibilities to share one's own experiences and to comment on posts of friends (Chan, 2015; Hou et al., 2018; Montag, Becker, & Gan, 2018). Additionally, WeChat offers "apps within an app" (Chan, 2015) adding

<sup>1</sup> Of note, given methodological reasons outlined in the Supplementary Material, we will focus on the more widely used WeChat and QQ platforms in China in the present work despite also having assessed data on SinaWeibo and TikTok (see also preregistration of the present work).

numerous functions to the WeChat app from which one can choose. Most prominently, one can pay and send money to friends via the WeChat app, use city services, and play games (Montag, Becker, & Gan, 2018). QQ is also an instant messaging service and one of the oldest social media platforms in China (Hjorth, Qiu, Zhou, & Wei, 2014). In terms of functionality, it is often compared to the MSN messenger (Meng & Zuo, 2008). Next to messaging functions, it offers additional add-ons such as games and the Q-Zone where one can share content with others (Pang, 2021).

Against the background and findings of the previous work (Sunstein, 2020), we expected to find a WTA/WTP disparity (i.e., higher WTA than WTP scores) for both WeChat and QQ. We could not, however, formulate a hypothesis on potential differences in disparities between the two platforms due to lack of existing literature.

### 1.1.3. Applying an individual differences perspective to WTA, WTP, and the WTA/WTP disparity

The procedure to assess WTA, WTP, and the WTA/WTP disparity across two groups, as implemented by Sunstein (2020) and many others, has some disadvantages. For example, this procedure prevents the possibility of investigating individual WTA/WTP disparity scores and associate them with other individual differences variables, accordingly. Therefore, the WTA/WTP disparity is often investigated as a general psychological phenomenon. However, associations of WTA, WTP, and their disparity with individual differences variables are highly interesting. This is because such associations can help to understand which psychological variables, such as personality traits, underly the WTA/WTP disparity. Indeed, some findings point to individual differences in the size of WTA, WTP, and their disparity, accordingly (Brown, 2005; Georgantzis & Navarro-Martínez, 2010; Kogut & Kogut, 2011). These findings further support the idea of investigating these scores on an individual level.

Therefore, we aimed to investigate WTA, WTP, and the WTA/WTP disparity for WeChat and QQ not only in a between-subjects (groups) design. Additionally, we followed the aim to explore individual scores in WTA, WTP, and the WTA/WTP disparity for these social media platforms in a within-subjects design study to associate them with other individual differences variables.

### 1.1.4. Investigating individual differences in WTA, WTP, and the WTA/WTP disparity in association with individual differences in other variables

#### 1.1.4.1. WTA, WTP, and the WTA/WTP disparity and usage of social media platforms.

One can assume that individuals using a social media platform more frequently and for a greater amount of time value the platform more. This assumption is underlined by a study from Taiwan showing positive associations of measures of epistemic, hedonic, and social value attributed to Facebook with Facebook “stickiness”, i.e., willingness to use Facebook (more) frequently/often (Yang & Lin, 2014). Since both WTA and WTP are measures of valuation of a good (Knetsch, 2020; Sunstein, 2020), time spent on a platform can be expected to positively relate to both WTA and WTP for this platform. Specifically for WTA, it can be assumed that individuals who use a platform frequently and time intensively might have greater trouble discontinuing their usage. Following from this, individuals using a platform more should report higher WTA scores compared to individuals using the platform less. This assumption on WTA is supported by a study showing positive associations between time spent on Facebook and the amount of money individuals needed to be paid to discontinue using Facebook for a week (a version of a WTA measure) (Mosquera, Odu-nowo, McNamara, Guo, & Petrie, 2020). However, for WTP, in addition to a positive association with time spent on a platform, also the possibility of a zero-correlation is possible. Following an argument of Sunstein (2020), social media platforms might be “Wasting Time Goods” (Sunstein, 2020, p. 5). As such, although some individuals might use

certain social media platforms a great deal, at the same time they may view them as valueless and useless. They only use the platforms out of habit but assume that they might be better off without using them (Sunstein, 2020). If people view social media as “Wasting Time Goods” their time spent on social media platforms should not be associated with their WTP. Moreover, currently users do not need to pay for using most social media platforms (all which are under investigation here). Hence, as a kind of rebellious act, it is also possible that many people indicate that they are not willing to pay anything for a service currently freely available; at least in terms of money. This assumption is underlined by findings of Sunstein (2020), who reported that between 15%–46% of participants were not willing to pay any amount for using different social media platforms. Although these numbers were not related to social media use variables, they underline that variability in WTP scores might be limited, minimizing potential associations of WTP scores with other variables such as time spent on a platform.

In summary, it can be assumed that WTA is positively associated with time spent on a platform. For WTP, both is possible - a positive association with time spent on the platform as well as a zero-correlation between the two variables. For the WTA/WTP disparity, this has the following implications: The disparity is either not related to time spent on a platform (when both WTA and WTP are related to time spent on the platform to the same degree) or positively related to the time spent on a platform (when WTA but not WTP is related to time spent on the platform). In our opinion, more theory and empirical findings support the second assumption of a positive relation between the WTA/WTP disparity and time spent on the platform.

In addition to time spent on a platform, we were interested in investigating associations between WTA, WTP, and the WTA/WTP disparity for WeChat and QQ and tendencies towards overall Social Networks Use Disorder (SNUD). SNUD is a specific type of Internet Use Disorder describing excessive, i.e., pathological, use of social media platforms; note ongoing discussions on the “correct” nomenclature of Internet Use Disorders (Elhai, Yang, & Levine, 2020; Montag, Wegmann, Sariyska, Demetrovics, & Brand, 2021). Researchers describe SNUD based on a strong urge to use social media, and using social media too much, resulting in negative impacts on one's life (Andreassen & Pallesen, 2014). Symptoms discussed in light of SNUD are in parts similar to substance-use disorder symptoms (Andreassen, 2015; Griffiths, Kuss, & Demetrovics, 2014). However, SNUD is not currently included in official diagnostic manuals (American Psychiatric Association, 2013; World Health Organization, 2019).

Since SNUD is related to an urge to use social media platforms, it can be expected that SNUD symptom severity is positively related to WTA, because individuals with high SNUD scores should have difficulties discontinuing social media use. For WTP the same argumentation as for time spent on the platform can be discussed. This argumentation leads to assuming either a positive association or - what we deem more likely for the specific “good” of using social media - no association between SNUD and WTP. Thus, we expected the WTA/WTP disparity for WeChat and QQ to be positively related to tendencies towards SNUD due to the same reasoning already explained in light of time spent on social media platforms.

#### 1.1.4.2. WTA, WTP, and the WTA/WTP disparity and personality.

Associating individual differences in personality traits with prominent scores derived from behavioral economics - such as WTA, WTP, and the WTA/WTP disparity - can shed light on underlying psychological mechanisms. A widely accepted personality model is the Five-Factor model constituting that personality can be described on the basis of five broad personality domains (Fiske, 1949; a short summary can be found in: Montag & Elhai, 2019). Oftentimes these domains are labeled Openness (to Experience), Conscientiousness, Extraversion, Agreeableness, and Neuroticism and are known as the Big Five of Personality (Goldberg, 1990; Tupes & Christal, 1992).

Previous research indicates that time spent on social media is especially positively related to Extraversion and Neuroticism, and negatively related to Conscientiousness (Hughes, Rowe, Batey, & Lee, 2012; Montag et al., 2015; Ryan & Xenos, 2011). This might indicate an indirect association of Conscientiousness, Extraversion, and Neuroticism with WTA and the WTA/WTP disparity for social media platforms. This is due to WTA putatively being closely linked to time spent on the respective platform (see paragraph “WTA, WTP, and the WTA/WTP disparity and usage of social media platforms”). Moreover, in one study it was found that WTA for a bottle of wine was negatively related to Extraversion and Conscientiousness, while WTP was positively associated with Agreeableness; the disparity was not investigated in light of associations with personality (Georgantzis & Navarro-Martínez, 2010). Accordingly, one might conclude that Extraversion, Conscientiousness, and Agreeableness are negatively related to the WTA/WTP disparity, at least for a bottle of wine. Moreover, an experimental study manipulating emotions found that the WTA/WTP disparity for a mug was only prevalent when happy (but not negative) emotions were induced (Lin, Chuang, Kao, & Kung, 2006). This finding raises the question of whether general tendencies of (positive versus negative) emotionality might also be associated with the WTA/WTP disparity on an individual level. As part of the Big Five personality traits, higher Neuroticism is robustly associated with higher negative emotionality (Rammstedt & Danner, 2017). Based on experimental findings on effects of emotions on the WTA/WTP disparity, one might expect Neuroticism to be negatively associated with the WTA/WTP disparity.

These previous studies reflect the possibility that personality might be associated with individual differences in WTA, WTP, and the WTA/WTP disparity. However, none of the studies investigated WTA and WTP for social media platforms in Chinese samples. Moreover, some findings lead to contradicting hypotheses on the direction of effects regarding certain personality trait associations with WTA, WTP, and the WTA/WTP disparity (see previously mentioned findings on Extraversion and Neuroticism). Further, one must take into account the large number of individuals not willing to pay for social media found in Sunstein (2020), which potentially affects relations between WTP and personality traits (see reasoning detailed above). Thus, it remains unclear whether and how (i.e., direction of effects) personality dispositions are associated with WTA, WTP, and their disparity for (Chinese) social media platforms. Therefore, we aimed to exploratively investigate associations of the Big Five personality traits with WTA, WTP, and the WTA/WTP disparity for the Chinese social media platforms WeChat and QQ.<sup>2</sup>

## 1.2. Summary of aims of the present study

In summary, the present study had several aims: First, WTA, WTP, and the WTA/WTP disparity for prominent Chinese social media platforms (WeChat and QQ) should be investigated in a between-groups design study to receive insights against the background of the “classic” experimental approach across two groups (Study 1) and to replicate the study design by Sunstein (2020). Secondly, WTA, WTP, and the WTA/WTP disparity in the context of WeChat and QQ should be investigated in a within-subjects design study. Thereby, we aimed to associate individual differences in these variables with individual differences in personality, time spent on the respective platform, and SNUD to unravel the underlying psychology of WTA, WTP, and the WTA/WTP disparity in the context of (Chinese/Eastern) social media platforms.

<sup>2</sup> In the preregistration we expected Neuroticism (negatively) and Extraversion (positively) to be directly linked to the WTA/WTP disparity. However, we dismissed these hypotheses after evaluating the literature more in-depth.

## 2. Materials and methods

### 2.1. Preregistration and data availability

The present studies including study design, sample size, inclusion/exclusion criteria and analyses were preregistered at the Open Science Framework (<https://osf.io/kcpmf>). All deviations from the preregistration are described in this manuscript. Data and a data analysis script are available at the Open Science Framework as well.

### 2.2. Study design and procedure

In total, the project consisted of three online surveys: Two for Study 1 and one for Study 2. The surveys were implemented on the Chinese online platform <https://www.wjx.cn/>. Anyone from age 18 who understood simplified Chinese characters could participate. Data were collected at universities in China in 2020. More specifically, to ensure independence of the samples, each sample was recruited at a different university in China. At all universities, the same recruitment strategy was applied to counteract potential biases between samples: In addition to students recruited in general psychology courses, friends and family of students could participate; hence, a snowballing recruitment strategy was applied to obtain a broader sample than just psychology students. Participants received 8–12 (Chinese) RMB (about \$1.25–1.88 (USD); exchange rate information from: 2021.11.30) for completing one of the surveys. The local ethics committee at Tianjin Normal University approved the studies. All participants gave informed electronic consent before participation.

#### 2.2.1. Study 1: Between-groups study design

In one online survey conducted in the realm of Study 1, participants were asked to fill in several sociodemographic variables and to indicate which of the four social media platforms – WeChat, SinaWeibo, QQ, TikTok – they used. For each platform used they were further asked to indicate their WTA for each platform (see paragraph “Study 1 and 2: WTA and WTP items”). The second online survey was similar but participants were asked to indicate their WTP for each platform they used.

#### 2.2.2. Study 2: Within-subjects study design

The online survey for Study 2 asked participants to i) complete sociodemographic items, ii) indicate which social media platforms they used, iii) insert their WTA and afterwards their WTP for each platform used (67 items of other questionnaires were presented in between WTA and WTP items), iv) indicate time spent on each platform used, and complete v) the short Bergen Social Media Addiction Scale (BSMAS) and vi) the Big Five Inventory (BFI).<sup>3</sup>

One might assume that assessing both WTA and WTP from each individual study participant in a within-subjects design study leads to biases. One potential bias could be based on the desire to answer consistently (Cialdini, 2006). Based on this, the values given by a participant for WTA and WTP might be matched to be more consistent, despite individuals actually wanting to answer differently. Moreover, when an individual is first asked to indicate his/her WTP for a product, this might bias his/her later response on WTA, because he/she previously took the perspective of a “buyer”, or vice-versa. Hence, an anchoring effect might be visible. However, several works report that there are no or only minor differences in WTA/WTP disparities between

<sup>3</sup> Of note: The sample of this survey also completed questionnaires investigated in light of other research questions on i) associations of acceptance versus fear of Artificial Intelligence with personality and ii) associations of fear of COVID-19 with personality and social media and smartphone use disorder tendencies during the pandemic (Montag et al., 2021); the results regarding these research objectives are/will be published in different papers given the differences in the topics under investigation.

studies using a between- versus within-subjects design (investigating main effects) (Gaechter, Johnson, & Herrmann, 2007; Penn & Hu, 2021; Sayman & Öncüler, 2005; Tunçel & Hammitt, 2014); although it needs to be noted that these analyses did not comprise studies on social media use.

### 2.3. Samples

A flow chart summarizing the steps taken to derive the final samples under investigation in the present work is presented in Fig. 1. A detailed description and explanation of each step is presented in the Supplementary Material.

#### 2.3.1. Final samples of study 1

Sociodemographic information on final samples investigated in light of WeChat and QQ are presented in Table 1. As can be seen in this table, the sociodemographic background of the WTA and WTP samples investigated in the context of WeChat and QQ, respectively, are similar.

#### 2.3.2. Final samples of study 2

For the sample recruited to investigate individual scores, we extracted  $n = 125$  men and  $n = 125$  women to investigate WTA, WTP, and the WTA/WTP disparity in the context of WeChat (age:  $M = 21.27$ ;  $SD = 5.45$ ;  $n = 237$  were students). Similarly,  $n = 128$  men and  $n = 128$  women were extracted to investigate WTA, WTP, and the WTA/WTP disparity in the context of QQ (age:  $M = 21.65$ ;  $SD = 6.10$ ;  $n = 240$  were students).

### 2.4. Measures

All measures were presented in simplified Chinese characters.

#### 2.4.1. Study 1 and 2: WTA and WTP items

In the WTA survey of Study 1, the following item was presented to individuals using a certain platform: “Suppose that you are being offered money to stop using [platform]. How much would you have to be paid per month, at a minimum, to make it worth your while to stop using [platform]?” In the WTP survey of Study 1, the following item was presented to individuals using a certain platform: “Suppose that you had to pay for the use of [platform]. How much would you be willing to pay, at most, per month?” The items on WTA and WTP were based on the

work by Sunstein (2020) and translated into Chinese by a forward- and backward translation procedure and subsequent discussions in case of deviations between the English original items and their back-translations.

In the within-subjects design study sample recruited for Study 2, both items on WTA and WTP were assessed for each platform participants used.

Since individuals were asked for WTA and/or WTP for each platform they indicated using, participants could be asked for WTA and WTP for more than one platform, which is why the WeChat and QQ samples partly overlap.

#### 2.4.2. Study 2: Big Five Inventory

We used the Chinese version of the BFI (John, Donahue, & Kentle, 1991; Pervin & John, 2003) in the sample recruited for Study 2. It consists of 44 items answered on a 5-point Likert-Scale from 1 = “disagree strongly” to 5 = “agree strongly”. The present work will focus on the scales assessing the broad Big Five domains. In the sample to investigate WeChat ( $N = 250$ ), Cronbach's alphas lied between 0.65 (Agreeableness) and 0.75 (Openness with item 35; 0.79 without item 35; this item was negatively related to the total scale but kept for analysis in line with the original scaling). In the sample for QQ ( $N = 256$ ), Cronbach's alphas lied between 0.66 (Agreeableness) and 0.76 (Openness with item 35; 0.80 without item 35).

#### 2.4.3. Study 2: Social media use variable and social networks use disorder scale

For each of the social media platforms under investigation a participant indicated using, he/she was asked how many hours per day he/she spent on the platform on average; including the possibility to insert decimal numbers to indicate, for example, half an hour.

Moreover, the short version of the BSMAS (Andreassen, Torsheim, Brunborg, & Pallesen, 2012) was presented to participants. It was translated into Chinese by a forward- and backward-translation procedure and subsequent discussions in case of deviations between the English original items and their back-translations. Response options range between 1 = “very rarely” and 5 = “very often”. In the samples to investigate WeChat ( $N = 250$ ) and QQ ( $N = 256$ ) Cronbach's alphas were 0.87 and 0.86, respectively.

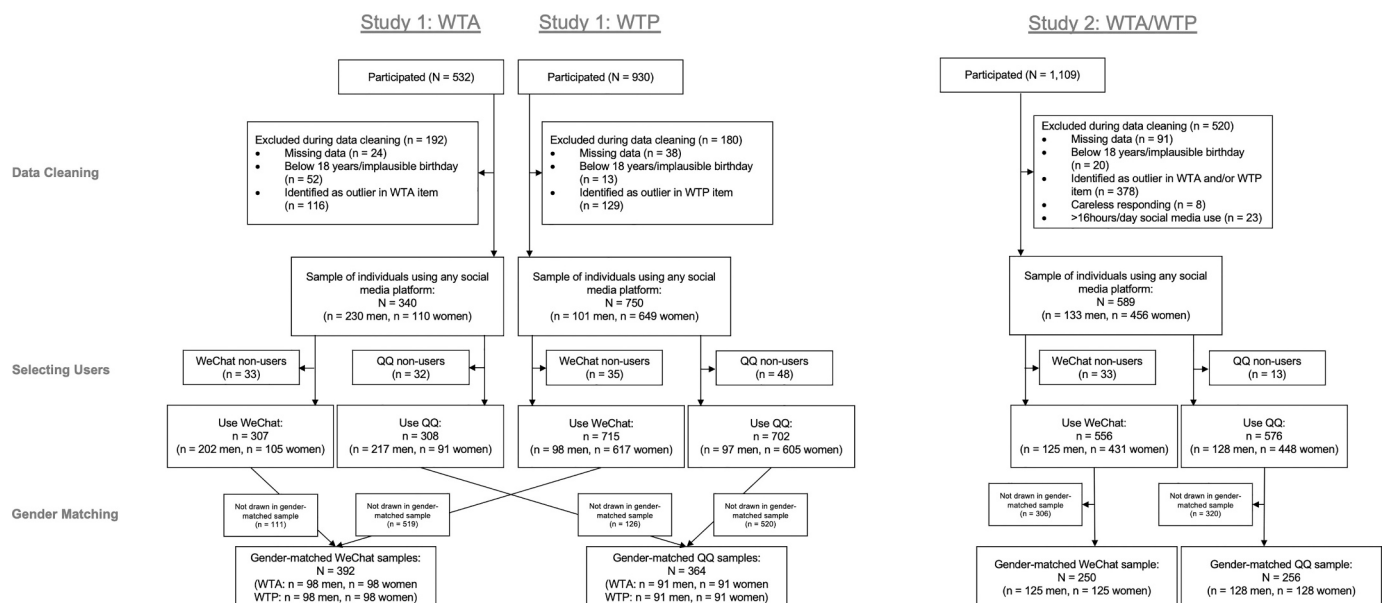


Fig. 1. Flow chart describing the steps to derive the final samples.

**Table 1**

Sociodemographic background of samples investigated in the context of WeChat and QQ in Study 1.

	WeChat			QQ		
	WTA sample (N = 196)	WTP sample (N = 196)	Differences between WTA and WTP samples	WTA sample (N = 182)	WTP sample (N = 182)	Differences between WTA and WTP sample
$n_{\text{men}}$	98	98	–	91	91	–
$n_{\text{women}}$	98	98	–	91	91	–
Age: $M$ ( $SD$ )	22.07 (6.76)	21.23 (3.39)	$t(287.52) = 1.54, p = 0.125,$ $d = 0.16$	21.05 (5.58)	21.11 (2.94)	$t(274.38) = -0.12, p = 0.907,$ $d = 0.01$
$n_{\text{students}}$	168	174	$\chi^2(1) = 0.83, p = 0.364, phi = 0.05$	164	161	$\chi^2(1) = 0.26, p = 0.611, phi = 0.03$

Note. Comparisons between WTA and WTP samples investigated in the context of WeChat or QQ reveal no significant differences in gender distribution, mean age, or distribution of individuals with a student (versus non-student) status.

## 2.5. Statistical analysis

The statistical software R version 4.1.0 and RStudio version 1.4.1106 were used for data analysis (R Core Team, 2021; RStudio Team, 2020). The following packages were used: readxl version 1.3.1 (Wickham & Bryan, 2019), dplyr version 1.0.6 (Wickham, François, Henry, & Müller, 2021), tidyr version 1.1.3 (Wickham, 2021), carelless version 1.2.1 (Yentes & Wilhelm, 2021), psych 2.1.3 (Revelle, 2021), descr version 1.1.5 (Aquino, 2021), sampling version 2.9 (Tillé & Matei, 2021), lsr version 0.5 (Navarro, 2015), Hmisc version 4.5-0 (Harrell, 2021), correlation version 0.7.0 (Makowski, Ben-Shachar, Patil, & Lüdtke, 2020), and ggplot2 version 3.3.3 (Wickham, 2016). Of note, the analysis on the WTA/WTP ratios will include analysis on mean (preregistered) and median values (not-preregistered).

### 2.5.1. Study 1: Analysis across separate samples (between-groups design)

Within each WTA and WTP sample, the mean/median WTA and WTP scores were calculated. Afterwards, the WTA/WTP ratios were computed across groups ( $M(WTA_{\text{WeChat}}) / M(WTP_{\text{WeChat}})$ ;  $M(WTA_{\text{QQ}}) / M(WTP_{\text{QQ}})$ ); in this formula M can be interpreted as mean or median).

### 2.5.2. Study 2: Analysis in samples providing individual scores (within-subjects design)

All analyses described below were conducted separately in the samples using WeChat ( $N = 250$ ) and QQ ( $N = 256$ ). Within the datasets comprising individual WTA and WTP scores for WeChat or QQ, most variables showed a skewness and kurtosis of less than  $\pm 1$ . Only skewness and/or kurtosis of age, WTA, and WTP scores (except WTP for WeChat), as well as WTA/WTP ratios, and time spent on WeChat/QQ exceeded  $\pm 1$  (Miles & Shevlin, 2001).

First, descriptive statistics of WTA, WTP, and the WTA/WTP ratios were examined. Therefore, the mean/median WTA and WTP for WeChat and QQ were calculated at the group level in the respective samples. Afterwards, the ratios of mean/median WTA divided by mean/median WTP for the respective platform were calculated ( $M(WTA_{\text{WeChat}}) / M(WTP_{\text{WeChat}})$ ;  $M(WTA_{\text{QQ}}) / M(WTP_{\text{QQ}})$ ).

Next, individual WTA/WTP ratios for each participant were calculated and descriptive statistics of these individual scores are presented,

**Table 2**

WTA and WTP scores within each sample and WTA/WTP ratios across WTA and WTP samples.

	WeChat		QQ	
	WTA sample (N = 196)	WTP sample (N = 196)	WTA sample (N = 182)	WTP sample (N = 182)
WTA: $M$ ( $SD$ )	4134.93 RMB (5624.91)		7820.62 RMB (17010.71)	
WTP: $M$ ( $SD$ )		5.42 (5.94)		5.46 (5.83)
WTA/WTP ratio based on means		763.13		1433.39
WTA: Median	2000		2000	
WTP: Median		2		3
WTA/WTP ratio based on medians		1000		666.67

Note. 1 RMB corresponds to around \$0.16 (2021.11.26). WTA/WTP ratios based on means are based on unrounded mean WTA and mean WTP scores.

as well. Similarly, descriptive statistics for BFI scores, time spent on WeChat or QQ, and the short BSMAS were calculated and are presented. Associations of all variables of interest with age and gender can be found in the Supplementary Material (presented in line with the preregistration and for interested readers).

Next, zero-order bivariate correlations between all study variables were computed. Of note, the structural equation models which were preregistered were not computed and are not presented due to the low (near zero correlations) between the variables.

## 3. Results

### 3.1. Study 1: Results across separate samples (between-groups design)

The WTA and WTP scores within each sample and WTA/WTP ratios across WTA and WTP samples are displayed in Table 2. As can be seen from this table, disparities were found for both WeChat and QQ and based on mean and median WTA and WTP scores. This is illustrated by higher WTA as compared to WTP scores and in WTA/WTP ratios exceeding 1.

### 3.2. Study 2: Results in samples providing individual scores (within-subjects design)

#### 3.2.1. WTA, WTP, and WTA/WTP ratios on group level

As depicted in Table 3, also in the within-subjects design study WTA/WTP disparities (i.e., ratios  $> 1$ ) were observed for both WeChat and QQ and based on mean as well as on median scores.

#### 3.2.2. Descriptive statistics on individual score level

In Table 4, descriptive statistics of all variables from the individual differences sample are presented. A graphical illustration of the results of different approaches to calculate the WTA/WTP ratio based on medians for both WeChat and QQ can be found in Fig. 2.

#### 3.2.3. Zero-order correlation analysis

##### 3.2.3.1. WeChat. Table 5 presents the zero-order correlations between

**Table 3**  
WTA and WTP scores as well as WTA/WTP ratios in the samples of Study 2.

	WeChat (N = 250)	QQ (N = 256)
WTA: M (SD)	647.76 RMB (1023.29)	915.43 RMB (1760.34)
WTP: M (SD)	6.50 RMB (6.00)	6.61 RMB (6.61)
WTA/WTP ratio based on means	99.59	138.59
WTA: Median	200	300
WTP: Median	5	5
WTA/WTP ratio based on medians	40	60

Note. 1 RMB corresponds to around \$0.16 (2021.11.26). WTA/WTP ratios based on means are based on unrounded mean WTA and WTP scores.

**Table 4**  
Descriptive statistics of individual differences scores.

	WeChat (N = 250)	QQ (N = 256)
	M (SD)	M (SD)
WTA/WTP ratio	307.96 (695.91)	453.77 (1304.39)
Openness	3.29 (0.50)	3.24 (0.51)
Conscientiousness	3.14 (0.49)	3.12 (0.47)
Extraversion	3.07 (0.51)	3.05 (0.53)
Agreeableness	3.67 (0.47)	3.65 (0.47)
Neuroticism	2.97 (0.56)	2.98 (0.55)
Time spent on the platform (in hours per day)	1.50 (1.22)	2.42 (1.72)
Short Bergen Social Media Addiction Scale	2.76 (0.74)	2.70 (0.73)

Note. Some individuals indicated a WTP of 0.00 RMB; to be able to calculate an individual ratio, we exchanged these scores with a value of 1 (this was the next higher number indicated by other participants; this transformation was not preregistered but otherwise we could not have calculated individual ratios). Median scores of the WTA/WTP ratios were: WeChat: 50.00, QQ: 50.00. The time spent on the platform is presented in hours per day, hence, value of, for example, 1.50 indicated 90 min and a value of 2.42 indicates roughly 146 min.

the WTA/WTP ratio for WeChat, BFI scales, time spent on WeChat, and short BSMAS scores. As can be seen in this table, the WTA/WTP ratio significantly correlated with only Openness (negatively). Exploratory (not-preregistered) associations of WTA and WTP scores separately with the other individual differences variables of main interest can be found in Supplementary Table 2.

3.2.3.2. QQ. In Table 6, zero-order correlations between the WTA/WTP ratio for QQ, BFI scales, time spent on QQ, and short BSMAS scores are presented. The WTA/WTP ratio for QQ significantly correlated with Openness (negatively) and Conscientiousness (negatively) as well as with the time spent on the platform (positively). Exploratory (not-preregistered) associations of WTA and WTP scores separately with the other individual differences variables of main interest can be found in Supplementary Table 2.

#### 4. Discussion

Our first aim related to the present studies was to investigate WTA, WTP, and the WTA/WTP disparities for prominent Chinese/Eastern social media platforms. More specifically, we were interested in whether we would find results similar to those observed by Sunstein (2020), namely (large) WTA/WTP disparities, for (Chinese) social media platforms. In a between-groups design study (Study 1) and a within-subjects design study (Study 2), we found evidence for high WTA and comparatively low WTP scores for both WeChat and QQ, hence, WTA/WTP disparities. These results not only replicate those found for Western social media platforms (Sunstein, 2020), but also show that a WTA/WTP disparity for social media platforms can be observed on group and individual levels.

On the one hand, the disparities found in the present samples were due to high WTA scores - between 648 RMB (\$101.35, 2021.11.29, within-subjects study) and 7821 RMB (\$1.223.20, 2021.11.29; between-groups study). These amounts (especially in the between-groups design study) were larger than previously observed for Western platforms

### WTA/WTP disparity in the realm of WeChat and QQ based on medians

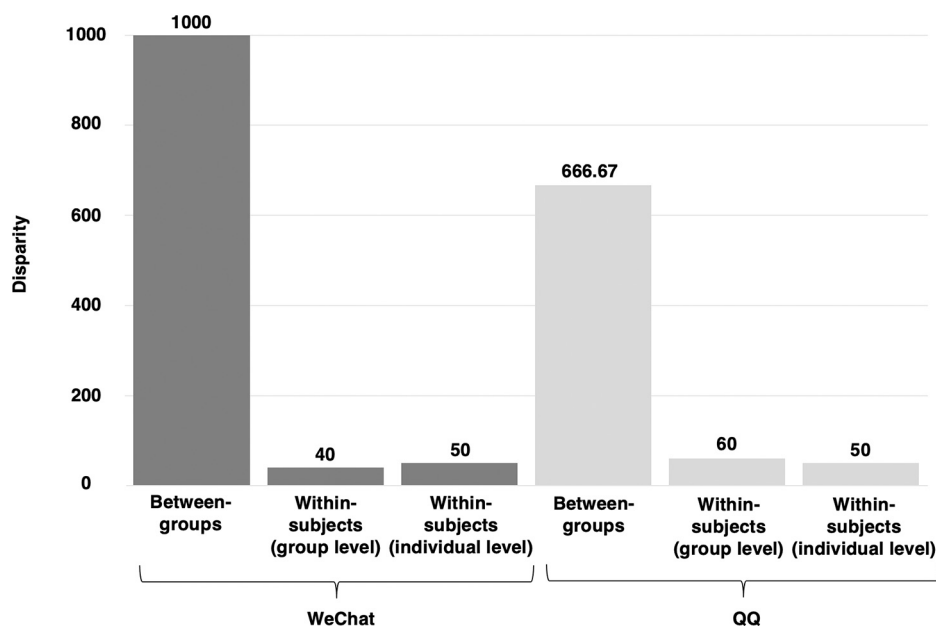


Fig. 2. Median scores of the WTA/WTP disparities/ratios for WeChat (dark grey) and QQ (lighter grey). Median scores of the WTA/WTP disparities/ratios for WeChat (dark grey) and QQ (lighter grey) are based on different approaches: Calculated from the medians of the two between-groups design study samples (Study 1; Between-groups), calculated from the group medians of WTA and WTP of the within-subjects design study sample (Study 2; Within-subjects (group level)), and calculated as median of WTA/WTP ratios calculated on individual level (Study 2; Within-subjects (individual level)).

**Table 5**  
Correlations between individual differences variables in the sample investigated in the context of WeChat.

	1.	2.	3.	4.	5.	6.	7.
1. WTA/WTP ratio							
2. Openness	$\rho = -0.16,$ $p = 0.012$ [-0.28; -0.03]						
3. Conscientiousness	$\rho = -0.07,$ $p = 0.286$ [-0.19; 0.06]	$r = 0.39$ $p < 0.001$ [0.28; 0.49]					
4. Extraversion	$\rho = -0.07$ $p = 0.277$ [-0.19; 0.06]	$r = 0.42$ $p < 0.001$ [0.31; 0.52]	$r = 0.28$ $p < 0.001$ [0.16; 0.39]				
5. Agreeableness	$\rho = 0.00$ $p = 0.954$ [-0.13; 0.12]	$r = 0.32$ $p < 0.001$ [0.21; 0.43]	$r = 0.43$ $p < 0.001$ [0.32; 0.52]	$r = 0.20$ $p = 0.001$ [0.08; 0.32]			
6. Neuroticism	$\rho = -0.02$ $p = 0.757$ [-0.15; 0.11]	$r = -0.25$ $p < 0.001$ [-0.36; -0.13]	$r = -0.38,$ $p < 0.001$ [-0.48; -0.27]	$r = -0.34$ $p < 0.001$ [-0.44; -0.22]	$r = -0.46$ $p < 0.001$ [-0.55; -0.35]		
7. Time spent on the platform	$\rho = -0.04$ $p = 0.563$ [-0.16; 0.09]	$\rho = -0.02$ $p = 0.764$ [-0.15; 0.11]	$\rho = 0.12$ $p = 0.054$ [-0.01; 0.25]	$\rho = 0.11$ $p = 0.088$ [-0.02; 0.23]	$\rho = -0.09$ $p = 0.177$ [-0.21; 0.04]	$\rho = 0.05$ $p = 0.399$ [-0.07; 0.18]	
8. Short Bergen Social Media Addiction Scale	$\rho = -0.08$ $p = 0.196$ [-0.21; 0.05]	$r = 0.05$ $p = 0.457$ [-0.08; 0.17]	$r = -0.15$ $p = 0.014$ [-0.27; -0.03]	$r = -0.05$ $p = 0.405$ [-0.18; 0.07]	$r = -0.16$ $p = 0.010$ [-0.28; -0.04]	$r = 0.27$ $p < 0.001$ [0.15; 0.38]	$\rho = 0.14$ $p = 0.028$ [0.01; 0.26]

Note. Uncorrected  $p$ -values and 95% confidence intervals are reported alongside correlations. If a manual correction for multiple testing (Holm's method,  $\alpha = 0.05$ ,  $k = 28$ ) is implemented, all correlations with  $p$ -values of 0.001 or lower remain significant.

**Table 6**  
Correlations between individual differences variables in the sample investigated in the context of QQ.

	1.	2.	3.	4.	5.	6.	7.
1. WTA/WTP ratio							
2. Openness	$\rho = -0.13$ $p = 0.033$ [-0.26; -0.01]						
3. Conscientiousness	$\rho = -0.12$ $p = 0.046$ [-0.25; 0.00]	$r = 0.47$ $p < 0.001$ [0.37; 0.56]					
4. Extraversion	$\rho = -0.11$ $p = 0.089$ [-0.23; 0.02]	$r = 0.47$ $p < 0.001$ [0.37; 0.56]	$r = 0.33$ $p < 0.001$ [0.22; 0.44]				
5. Agreeableness	$\rho = -0.01$ $p = 0.915$ [-0.13; 0.12]	$r = 0.34$ $p < 0.001$ [0.23; 0.44]	$r = 0.39$ $p < 0.001$ [0.28; 0.49]	$r = 0.25$ $p < 0.001$ [0.13; 0.36]			
6. Neuroticism	$\rho = 0.08$ $p = 0.221$ [-0.05; 0.20]	$r = -0.27$ $p < 0.001$ [-0.38; -0.15]	$r = -0.38$ $p < 0.001$ [-0.48; -0.27]	$r = -0.35$ $p < 0.001$ [-0.45; -0.23]	$r = -0.47$ $p < 0.001$ [-0.56; -0.37]		
7. Time spent on the platform	$\rho = 0.15$ $p = 0.016$ [0.02; 0.27]	$\rho = -0.11$ $p = 0.074$ [-0.23; 0.01]	$\rho = -0.06$ $p = 0.345$ [-0.18; 0.07]	$\rho = -0.08$ $p = 0.185$ [-0.21; 0.04]	$\rho = -0.09$ $p = 0.154$ [-0.21; 0.04]	$\rho = 0.09$ $p = 0.141$ [-0.03; 0.22]	
8. Short Bergen Social Media Addiction Scale	$\rho = -0.07$ $p = 0.248$ [-0.20; 0.05]	$r = 0.09$ $p = 0.139$ [-0.03; 0.21]	$r = -0.17$ $p = 0.008$ [-0.28; -0.04]	$r = -0.04$ $p = 0.510$ [-0.16; 0.08]	$r = -0.18$ $p = 0.004$ [-0.30; -0.06]	$r = 0.29$ $p < 0.001$ [0.18; 0.40]	$\rho = 0.06$ $p = 0.306$ [-0.06; 0.19]

Note. Uncorrected  $p$ -values and 95% confidence intervals are reported alongside correlations. If a manual correction for multiple testing (Holm's method,  $\alpha = 0.05$ ,  $k = 28$ ) is implemented, all correlations with a  $p$ -value of 0.001 or lower remain significant.

(Sunstein, 2020) leading to larger WTA/WTP disparities in the present studies compared to the previous work. One reason for the larger WTA scores might be that both WeChat and QQ have manifold functionalities aside from social functions (chatting, sending pictures, implementing phone calls, etc.), such as sending money to friends, paying, and using city services (see, for example, for WeChat: Chan, 2015; Montag, Becker, & Gan, 2018). Thus, both services might be much more incorporated into everyday life of Chinese individuals compared to social media platforms in the lives of Western individuals. Thus, giving up using WeChat and also QQ might be much more difficult than giving up a Western social media platform because many different services offered by WeChat/QQ would need to be substituted. In line with this, the higher number of functions offered by WeChat/QQ might result in higher WTA scores in the present work compared to what was observed in the work by Sunstein (2020) and higher WTA/WTP disparities,

accordingly. Methodological issues might contribute to the high WTA scores (and high WTA/WTP disparities) as well and are discussed in the limitations section.

On the other hand, the disparities found in the present study were due to low WTP scores and several individuals not willing to pay anything for using a social media platform. In fact, in the between-groups design study, 23.47% (WeChat) and 22.53% (QQ) of individuals, and 13.20% (WeChat) and 14.06% (QQ) of individuals in the within-subjects study were not willing to pay anything. These numbers are fairly in line with the findings of Sunstein (2020). The implications of these findings are two-fold. Firstly, because we were able to replicate the findings on WTP scores, we agree with the explanations of Sunstein (2020). More specifically, he mentions that the great number of individuals not willing to pay might be due to a rebellious act. Individuals might indicate 0 RMB because they are outraged about being asked to pay a monetary fee for a



service currently offered “for free” in terms of money. It remains unknown, however, in how far individuals were willing to pay if they really needed to pay for a social media platform. This also draws attention to potential issues related to the hypothetical scenario created in the present work (as discussed later). In summary, we agree with Sunstein (2020) in that WTP scores in the context of social media might not be the most valid scores to assess valuation of social media. WTA, therefore, might be a more valid measure of valuation in the context of social media use. This assumption is supported by the application of WTA measures in the context of social media in other studies (Brynjolfsson, Collis, & Eggers, 2019; Corrigan, Alhabash, Rousu, & Cash, 2018).

Aside from putatively being a biased measure of valuation, the scores in WTP still give important insights. In addition to the number of individuals not willing to pay (see above), these results reveal generally low WTP scores. The findings on low WTP scores are not only in line with the findings by Sunstein (2020) but also with a previous study on German individuals, which investigated whether and how much individuals were willing to pay for usage of a social media platform per month. This previous study reported that half of the participants were not willing to pay anything or at most 1€/1.25€ per month (1 € = \$1.13; 2021.11.29; median for social media: 1€, median for messenger services: 1.25€) (Sindermann, Kuss, Throuvala, et al., 2020). These findings are of major importance for current debates on whether using social media platforms should be paid for with money, instead of with the allowance that one's personal data are being used (Sindermann, Kuss, Throuvala, et al., 2020). This discussion is based on the negative impacts that the current data business model can have, such as prolonging time users spend on social media platforms putatively leading to use disorders in vulnerable individuals (Montag, Lachmann, Herrlich, & Zweig, 2019; Sindermann, Elhai, & Montag, 2020), invasions into privacy (see discussion on “surveillance capitalism” (Zuboff, 2019)), and information filtering putatively associated with negative effects on democracy (Bozdog & van den Hoven, 2015; Pariser, 2011; Sindermann, Elhai, Moshagen, & Montag, 2020; Sunstein, 2004, 2007). In summary, it seems like across different countries and social media platforms, many individuals are not willing to pay anything or at least only a very small amount of money for social media usage. This conclusion points towards difficulties in implementing monetary payment models in the future to reduce negative side effects of the data business model. Accordingly, more detailed studies investigating under which circumstances individuals are willing to pay for social media use are necessary. For example, certain improvements in design, friend suggestions, and information presentation (e.g., combatting Fake News) mechanisms on social media platforms might increase users' valuation and their WTP for a social media platform. However, it must also be noted i) that discussions on the current business model are mostly implemented in Western societies where huge, supranational, private companies own the platforms ii) and that we did not ask participants of the present studies to choose between paying with money versus paying with their data. Thus, whether participants prefer one payment option over the other remains unknown based on the present data.

Next, the present study followed the aim to investigate WTA, WTP, and the WTA/WTP disparity by means of an individual differences approach. Against our expectations, the WTA/WTP disparity scores for both WeChat and QQ were barely significantly associated with any of the other variables: The WTA/WTP disparity for WeChat was only significantly negatively associated with Openness; an association we did not expect beforehand. The WTA/WTP disparity for QQ was significantly associated with Openness (negatively), Conscientiousness (negatively), and time spent on QQ (positively); only the latter association has been hypothesized. To investigate these findings more in depth, associations of WTA and WTP separately need to be considered (see Supplementary Table 2). These results indicate that the associations of Openness with the WTA/WTP disparity scores are mostly driven by the negative associations of Openness with WTA for both WeChat and QQ (although correlations in the context of QQ are non-significant).

Moreover, time spent on QQ was positively related to both WTA and WTP for QQ, while time spent on WeChat was only significantly positively related to WTP for WeChat. The findings on associations between time spent on a platform and WTP might contradict the general assumption that social media platforms are seen as “Wasting Time Goods” (Sunstein, 2020).

The findings of negative associations between Openness and WTA and the WTA/WTP disparity for both WeChat and QQ seem especially interesting due to the replication across platforms. Individuals with high scores in Openness are described as being interested in manifold topics and as being open to new experiences, such as food, countries, and ideas (Rammstedt & Danner, 2017). A study by Kircaburun, Alhabash, Tosuntaş, & Griffiths (2018) shows that Openness is most strongly related to informational and educational use of social media. These activities/functions can easily be substituted by other online platforms such as news websites, etc. The wide availability of substitutes might explain the lower WTA in individuals scoring high in Openness and the lower WTA/WTP disparity, accordingly. This is in line with findings showing that availability of substitutes decreases the WTA/WTP disparity (Tunçel & Hammit, 2014). Although we do not want to overinterpret the present findings with regard to Openness (see small effect sizes (Cohen, 1988) and scatterplots presented in the Supplementary Material), the previously mentioned consideration on the importance of *how* and *why* individuals use a good/service is crucial for further studies investigating individual differences in WTA, WTP, and the WTA/WTP disparity (in the context of social media). As can be concluded from the present study, an interaction of individual characteristics and characteristics of the good/service under investigation and how and why it is used might ultimately explain differences in all scores (WTA, WTP, WTA/WTP disparity). These putative interactions have important implications for future studies and theory building. In light of social media platforms, for example, an examination of the different functions offered by WeChat and QQ (or in the Western context Facebook, etc.) and who tends to use which functions (i.e., usage motives based on the uses and gratification theory) might help to build an empirical model to explain individual WTA, WTP, and WTA/WTP disparity scores in the context of different social media platforms.

Some limitations of the studies must be mentioned. First of all, results are limited to the Chinese context and focus on Chinese students (not representative of the general Chinese population) and Chinese social media platforms. Although some results are in line with results of similar other studies from Western samples and on Western social media platforms (Sindermann, Kuss, Throuvala, et al., 2020; Sunstein, 2020), it is unclear whether these exact results can be replicated in other studies and are generalizable to other samples. This is especially true for results which have not been investigated previously as well as for the size of WTA, WTP, and the WTA/WTP disparities which differ across studies.

Moreover, there are some methodological limitations to the present studies. For example, we only asked users of specific platforms (WeChat and QQ) for their WTA and/or WTP, however, not non-users. This is positive because everybody asked about WTA and WTP knows about the functions offered by the platforms and can estimate their value, which might not be true for non-users. Additionally, we chose this procedure based on the work by Sunstein (2020). Nevertheless, it does not completely reflect the situation (owners versus non-owners) mostly investigated in light of the WTA/WTP disparity. Next, it might be possible that in the within-subjects design study (Study 2) the order of the WTA and WTP items (first WTA, afterwards WTP) had an effect on responses, hence, the WTA/WTP disparity. However, it must be noted that many unrelated items were presented in between the WTA and WTP items in the within-subjects design study (see “Materials and methods” section). Nevertheless, another potential limitation of the present work is that the WTA/WTP disparities in the between-groups design study were higher than in the within-subjects design study contradicting previous findings (Sayman & Öncüler, 2005; Tunçel & Hammit, 2014). This finding was due to lower WTA and higher WTP scores in the within-

subjects design study. The higher WTP scores in the within-subjects design study might be due to an anchoring effect based on first completing the WTA items. However, this is a potential explanation, which we cannot test with the present data. Moreover, why WTA (which was presented first in the within-subjects design study) was lower in the within-subjects sample compared to the between-groups study samples, remains unknown. Because the samples of the between-groups and within-subjects design studies were quite similar (see recruitment strategy, mean age, gender distribution, educational background), we do not believe that the discrepancies in the WTA/WTP disparities between samples are due to differences in the sociodemographic backgrounds of the samples. Nevertheless, because we recruited samples at different universities, there might still be some differences, which we did not acknowledge; we deem this as highly unlikely, though.

Moreover, the present studies asked for WTA and WTP in a hypothetical scenario. It is possible that results differ when individuals are actually confronted with the decision to stop using WeChat or QQ (WTA) and - more likely - with the decision on whether to pay to be able to continue using WeChat and QQ (WTP); although mixed findings on differences in WTA/WTP disparities between hypothetical and real scenarios on other goods than social media are reported in previous works (Horowitz & McConnell, 2002; Tunçel & Hammitt, 2014). Next, another methodological limitation is the fact that we did not set a highest amount of money from which participants could possibly choose; but see exclusion of outliers as described in the Supplementary Material. It is possible - especially against the background of the hypothetical scenario - that based on this lack of a monetary ceiling, some individuals inserted very high amounts of money for WTA to maximize their payoff. The lack of a monetary ceiling might also contribute to a further shortcoming of the present study, namely, the large mean and median WTA scores and large WTA/WTP-ratios, accordingly. Finally, it is important to note that we did not specify what exactly "stop using a social media service" meant: It could have been interpreted as simply "pausing" the use, i.e., being able to return to the platform anytime and still having one's social graph, stored photos, information, etc. It could have, however, alternatively been interpreted as completely deleting one's information from the platform; thus, having to reconnect with old friends when returning and losing all stored information, such as photographs, posts, etc. Disentangling these two aspects is an important research aim for forthcoming studies. Relatedly, also different psychological mechanisms seem to underly WTA and WTP (see different correlation patterns with other study variables in Study 2), which need further exploration in forthcoming studies.

## 5. Conclusions

In summary, the present work supports the existence of comparatively high WTA scores versus WTP scores, thus, WTA/WTP disparities for social media platforms in the Chinese cultural context. Moreover, the generally low WTP scores indicate difficulties in introducing monetary payment models to the social media context due to low acceptance of such models by users. Additionally, we found that individual differences in the WTA/WTP disparity scores were significantly related to Openness via its negative association with WTA. Other individual differences variables were barely associated with WTA, WTP, or their disparity. Future studies should investigate WTA, WTP, and their disparity in the context of social media platforms more in-depth to help reveal underlying mechanisms and specific functionalities of social media platforms underlying WTA, WTP, and their disparity.

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## Data availability statement

Data and analysis script are available alongside the preregistration at: <https://osf.io/r63qs/files>.

## CRediT authorship contribution statement

**Cornelia Sindermann:** Conceptualization, Methodology, Data curation, Formal analysis, Visualization, Project administration, Roles/Writing - original draft, **Haibo Yang:** Investigation, Funding acquisition, Writing - review & editing, **Shixin Yang:** Investigation, Writing - review & editing, **Jon D. Elhai:** Validation, Writing - review & editing, **Christiaan Montag:** Conceptualization, Methodology, Validation, Writing - review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. However, for reasons of transparency Dr. Montag mentions that he has received (to Ulm University and earlier University of Bonn) grants from agencies such as the German Research Foundation (DFG). Dr. Montag has performed grant reviews for several agencies; has edited journal sections and articles; has given academic lectures in clinical or scientific venues or companies; and has generated books or book chapters for publishers of mental health texts. For some of these activities he received royalties, but never from gaming or social media companies. Dr. Montag mentions that he is part of a discussion circle (Digitalität und Verantwortung: <https://about.fb.com/de/news/h/gesprachskreis-digitalitaet-und-verantwortung/>) debating ethical questions linked to social media, digitalization and society/democracy at Facebook. In this context, he receives no salary for his activities. Finally, he mentions that he currently functions as independent scientist on the scientific advisory board of the Nymphenburg group. This activity is financially compensated. Dr. Elhai notes that he receives royalties for several books published on posttraumatic stress disorder (PTSD); is a paid, full-time faculty member at University of Toledo; occasionally serves as a paid, expert witness on PTSD legal cases; and receives grant research funding from the U.S. National Institutes of Health.

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## Appendix A. Supplementary Material

Supplementary Material to this article can be found online at <https://doi.org/10.1016/j.actpsy.2021.103462>.

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