How Communication Style Shapes Relationship Boundary Regulation and Social Media Adoption

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ABSTRACT

We develop and validate a multi-item measure for perceived relationship boundary regulation and show how it significantly drives adoption and use of four social media platforms: Facebook, Instagram, Twitter, and LinkedIn. We further show how this perception is tied to one's communication style.

CCS CONCEPTS

• **Security and privacy** → Human and societal aspects of security and privacy • **Human-centered computing**

KEYWORDS

Social Media, adoption, privacy, communication style

1 INTRODUCTION

The past decade has witnessed an explosion of social media platforms and widespread user adoption. Facebook alone is used by two-thirds of American adults, with three-quarters of those users logging in at least daily [43]. Other widely used social media include platforms such as Instagram (35%), Twitter (24%), and LinkedIn (25%) [43]. According to Pew, while daily engagement with Facebook has consistently increased over the years, engagement on other platforms has fluctuated greatly from year to year [13, 43].

Past research has shown that social media use leads to benefits such as increased social capital, psychological well-being, and socio-emotional support [9, 21]. Given these benefits, it is important to understand what drives and detracts from social media usage across different platforms.

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Much research and the popular press have focused on privacy concerns as a barrier to social media adoption and use. However, studies have had mixed results when using privacy concerns to predict social media disclosure and adoption, which illustrates a privacy paradox where behavior does not match stated concerns [5, 15]. This may be because the most widely used privacy scales (e.g., CFIP, IUIPC, Westin Segmentation) focus on informational privacy and data protection [7, 28, 51]. Recent work [12, 55] suggests that social privacy concerns, which goes beyond informational privacy concerns, and includes psychological, interactional, and physical privacy concerns, can predict specific privacy behaviors such as self-disclosure and protective measures. However, there is not yet a commonly accepted measure of social privacy [36]. Moreover, meta-review reveals that concerns still do not predict social media adoption and use [5].

In this study, we draw on Altman's conception of social privacy as a boundary regulation process [1, 37]. Scholars have identified various boundaries such as information disclosure, accessibility, identity, or temporality [37]. Notably, being inaccessible is as much a privacy problem as being overly accessible. Managing relationship boundaries is highlighted as playing the most significant role in managing one's privacy on social media [35, 52]. In other words, concerns about social media damaging one's relationships play the biggest role in shaping privacy attitudes. This could be triggered by any number of reasons connected to using social media, such as concern about boundary turbulence arising as a result of unclear rules around (re)sharing private information [38].

These definitions of relationship boundary management consider boundaries at a higher-level of analysis than a single disclosure or interaction. They look at the holistic impact of using social media on one's ability to manage relationship boundaries. For example, Wisniewski et al. [52] explain: "Relationship boundaries relate to one's deciding whether or not to allow someone to be a member of their social network and subsequently defining the appropriate context for that relationship" on social media. They further point out the importance of relationship boundary management for privacy management: "While relational boundaries do not tend to fit in the traditional definition of privacy management, we

argue that relationship boundaries may be even more important than other privacy boundaries because SNSs implement 'friend-based privacy' in that what one shares is directly related to whom one is connected." [52].

A review of social science research on the role of technology mediation and managing social relationships reinforces this meso-conceptual level of analysis: "A relationship stretches over a period of time that exceeds individual interactions… each of these mediated interactions reactivates, reaffirms, and reconfigures the relationship." As a result, "we cannot talk of mediated relationships in the same way as we spoke of mediated interactions." [26] Rather than focus on micro-level interactions, one must consider the relationship as a whole.

Page et al. do this by focusing on people's concerns about how using location-sharing social media affect their relationships. They identify concerns for preserving one's relationship boundaries as a root cause of various social privacy concerns [35]. Previous studies have used low-level privacy concerns (including informational, psychological, interactional, and physical privacy concerns) to predict social media use and adoption with mixed success. We extend Page et al.'s higher-level focus on privacy as relationship boundary regulation and apply it to a wider variety of social media and measure it for various platforms. We also expand on their single-item measure to create a more robust measure. Moreover, we take an important predictive step beyond Page et al.'s work, and hypothesize that concerns about relationship boundary regulation would curtail adoption and usage:

H1: Relationship Boundary Regulation Concerns negatively impact social media adoption and usage.

We also draw on different work by Page et al. that identifies an FYI communication style as the key driver of location-sharing social media adoption and usage [34]. This communication style consists of a personal preference for finding out about others and sharing about oneself without having to interact directly. Most popular social media platforms support this type of communication. We further develop a measure for FYI communication style and hypothesize that it leads to fewer concerns about relationship boundary regulation on social media:

H2: FYI communicators are less concerned about Relationship Boundary Regulation on social media.

We develop measurement scales for these constructs and validate our hypotheses by performing factor analysis and structural equation modeling on a survey administered in the U.S. (N=113). Our findings confirm these hypotheses across four social media platforms, thus overcoming the privacy paradox by using relationship boundary regulation to predict social media usage. Moreover, we provide insight into what drives relationship boundary regulation concerns, as well as how these concerns vary from platform to platform (i.e., comparing relationship boundary regulation concerns and its consequences, across Facebook, Instagram, Twitter, and LinkedIn). In doing so, this work highlights how these platforms cater to a certain segment of the population who prefer a FYI communication style, but potentially causes anxiety for others. We discuss the design implications and suggest ways to alleviate concerns for non-FYI communicators who feel less able to regulate their relationship boundaries on social media.

2 RELATED WORK

2.1 Social Media Adoption

Researchers have investigated drivers and barriers to social media adoption. Social capital is one of the most consistently studied drivers of social media use (e.g., [14]). Other benefits include social interaction, influence, and connectedness [57]. Similarly, "the need to belong" and "the need for self-perception" can motivate usage [32]. Research has also focused on predictors such as narcissism, audience size, and desire to keep touch [11] as well as the perceived characteristics of the social media platform [42]. Common barriers to social media usage are privacy concerns. These can arise from feeling a loss of control, especially over personal information [18]. The ability to regulate privacy adequately leads to higher perceived connectedness and social capital [53].

2.2 Social Privacy and Scales

There are many conceptions of social privacy. Burgoon et al. identify informational, physical, social/communicational, and psychological privacy concerns [8]. Nissenbaum's Contextual Integrity framework identifies "norm violations" as a source of privacy violation [33]. Likewise, Petronio's Communication Privacy Management theory looks at private information and boundary turbulence when privacy rules are not coordinated [38]. Empirical studies also uncover social privacy concerns, e.g., being too accessible [48], barriers to individual development [45], or self-presentation [24], and show how they predict risk beliefs [56].

Most privacy scales measure *informational* privacy and seldom predict privacy-related behaviors for social technologies [36]. For example, the Westin segmentation, which separates people into fundamentalists, pragmatists, and unconcerned [51], and the Concern for Information Privacy scale (CFIP), which covers collection, errors, secondary use, and unauthorized access [44]. Malhotra et al. adapted CFIP for the online context to create the Internet User Information Privacy Concerns scale (IUIPC) [28]. Buchanan focuses on General Caution and Technical Protection [7]. Jia and Xu consider collective privacy that includes both the attitude of the user and the user's social networking site associates towards data control, access, and dissemination [17].

The weak link between privacy concerns and behavior is a consistent finding in privacy literature, and has been labeled the "privacy paradox" [15]. Although recent work

offers several explanations for discrepancies between stated attitudes and actual behavior, there is still no clear understanding of this phenomenon [5, 15]. Studies have made progress in predicting disclosure or privacy protective behaviors (e.g., restricting access to content) [12]. However, recent meta-analysis shows that privacy concerns still cannot predict actual social media use and (non) adoption [5].

To overcome the privacy paradox for social media adoption, we draw on the work of Altman [1] and turn to his conception of social privacy as Boundary Regulation. In this conceptualization of privacy, people regulate boundaries such as physical accessibility or information disclosure. Altman considers being too accessible to others as much of a problem as not being accessible enough, which results in isolation. Palen and Dourish further explain how Altman's concept of boundary regulation extends to the networked world [37], which has influenced many privacy researchers to consider boundary regulation along various dimensions such as information disclosure, identity, accessibility, temporality. For example, Lampinen et al. consider the boundary of increasing or decreasing publicness [22] and Stutzman & Hartzog examine the boundary for regulating group separation through multiple social media profiles [46]. Much of this work inspects social media *behavior* and privacy *violations* as a way to understand boundary regulation behaviors and motivations for a given context (e.g., [39, 50]). Our work focuses on the broader phenomenon of social media adoption and considers boundary regulation *beliefs*, which are likely influenced by boundary regulation violations and behaviors, as well as other factors. Because our study examines non-users as well as users, it is important to look at attitudes that lead to action or inaction, as is the case for non-users.

While some scholars consider regulation across multiple boundaries, others find it more productive to focus on a single most relevant boundary. In fact, several scholars have specifically identified *relationship* boundaries as the most relevant privacy boundary in *social media* contexts. Wisniewski et al. described relationship boundaries as "more important than other privacy boundaries" in context of social media [52]. Indeed, work by Page et al. identified Relationship Boundary Preservation Concern as a root cause of various social privacy concerns in location-sharing social media [35]. In other words, they found that having privacy concerns was only a symptom of users' more fundamental concern that their relationships would be negatively impacted by location-sharing services. They used a single-item measure of boundary preservation concern to predict privacy concerns: "I'm worried Location-sharing services will change my relationship with others." In a large scale survey (N=1532), this item predicted various concerns: being bothered by (or bothering others) with too much information; sharing more than intended; feeling compelled to interact with others; worrying that what others share will reflect badly on me; controlling who sees my information; others physically joining me at an inappropriate time; and knowing how to act on the platform. In following this line of work, we conceptualize social media privacy concerns as primarily emerging from relationship boundary regulation concerns. Hence, we operationalize this higher level concept of relationship boundary regulation.

Our contribution is a more robust measurement of the relationship boundary regulation concept that extends to social media in general. We find the Page et al. concept of boundary preservation especially applicable in light of a recent Pew report that uncovers very similar concerns to what was predicted by their boundary preservation concern item: People "strongly dislike" being bothered by "too much information"; do not want to "share too much info" about themselves; dislike "pressure" to interact with others; worried about "others posting" things about them; and the wrong "people seeing [their] posts or comments" [27]. Whereas previous studies have used these low-level privacy concerns to predict behavior with mixed success, we use the higher-level conceptualization of privacy as boundary regulation to predict behavior. To accomplish this, we expand on Page et al.'s single item [35] to create a multi-item measure that represents anticipation of both improvement and harm of relationship boundaries. This goes beyond the single negative item and considers both the positive and negative sides of relationship boundary regulation.

Another strand of boundary regulation research that stems from Altman [1] focuses on access to content and people. Petronio's Communication Privacy Management (CPM) theory [38] focuses on relationship boundaries by means of co-owned information and controlling access to that information. Scholars such as Marwick & boyd and Vitak also characterize a context collapse that negatively impacts information access [29, 49]. While this body of work emphasizes controlling access, by looking at the overall concern or hope for relationship boundary change, our work considers relational privacy boundaries at a meso-level of analysis commonly used in social science research [26]. Indeed, in our study we find that our constructs are effective at predicting social media usage and relevant for drawing a connection between privacy and social media behavior.

2.3 Personality, Communication Style, and Social Media Use

Many scholars have investigated the role of personality traits in shaping social media use (e.g., [2, 9, 10]). One of the most widely used taxonomies is the Big-5 model, which describes five broad traits: extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness [30]. However, researchers have found that more specific personality traits can be better predictors of behavior. For example, Willingness to Communicate has predicted success in education and leadership [31, 40]. Page et al. found that

their FYI communication style predicted over 50% of the variance in location-sharing social media usage intention. According to them, FYI communicators "preferred to learn others' whereabouts, availability, or recent activity" without communicating directly [34]. They preferred to avoid phone calls and felt that "more information is always good". Page et al. developed and validated two constructs: "preference for the FYI style for sharing my location" and "preference for the FYI style for learning others' locations." Drawing on their work, we adapt these FYI scales for social media in general and use them to predict adoption of four popular social media platforms. This FYI style trait could also be used in the future to predict preference for interactions, such as ambient awareness [25] or observational learning [4].

3 SURVEY STUDY

3.1 Methods

We developed a survey exploring various aspects of participants' adoption, use, and privacy concerns regarding online social networks. We piloted the survey with (N=24) individuals (students and non-students) in one of the authors' personal networks to check for understandability and roughly gauge factor fit. In December of 2016, we advertised a rolling survey for 30 days on Craigslist – a popular platform for advertising jobs, goods, etc. Since Craigslist sites are regional, we chose to post to sites in the four largest U.S. metropolitan areas based on the latest census data (2015): New York City, Los Angeles, Chicago, and Dallas Fort Worth. These are areas of comparable size and population density representing each census-defined geographic region. This was part of a larger IRB-approved survey study with incentives ($10 Amazon.com gift cards for the first 40 respondents, random drawing for one of two $100 Amazon.com gift cards for first 1000 respondents).

3.2 Participants

From a total of 179 completed surveys we eliminated responses that failed more than two of 10 attention checks, reverse-coded items, and redundant questions. This left us with N=113 valid responses. 98% have lived in the U.S. for at least five years. The participants (67 female, 46 male) were between 18 and 59 years old (mean: 34.7).

3.3 Measurement

We asked participants about their usage and relationship boundary regulation attitudes regarding four social networks: Facebook, Twitter, Instagram, and LinkedIn. We also asked questions about FYI/non-FYI communication style preferences for their own and others' online communication. Demographic information was included, but not significant in the model (e.g., age, gender, education, employment, and length of time living in the U.S.).

3.4 Use and Platform-specific Behaviors

For each social network, usage was measured through self-reporting by asking the question: "How often do you check or use the following social media?" (9-point response scale developed by referring to frequency responses from instruments used for recent Pew social media use surveys [3, 43]). Fig. 1 shows the distribution of the answers to this question for each of the four platforms. We acknowledge that this item measures both adoption and extent of use. We therefore validated that the results presented in the remainder of this paper also hold separately for use extent (dropping the categories "Never, but have an account" and "I do not have an account") and adoption (re-coding the categories "Never, but have an account" and "I do not have an account" to "0" and the remaining categories to "1").

We also measured various platform-specific behaviors, such as number of friends/followers, post visibility settings (only friends/followers or public), and frequency of sharing location with a post (never, sometimes, about half the time, most of the time, always). Since the availability and meaning of these behaviors differ substantially per platform, we do not include these behaviors in the overall model, but instead report additional effects per platform in a separate section.

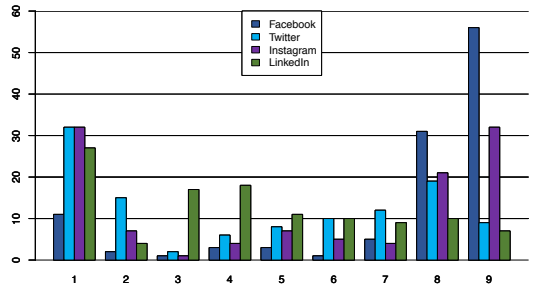

Figure 1: Frequency distribution of the extent to which participants in our study used each platform. 9: almost constantly, 8: several times a day, 7: once a day, 6: 3-5 days a week, 5: 1-2 days a week, 4: every few weeks, 3: less often, 2: Never, but I have an account, 1: I do not have an account.

3.5 Relationship Boundary Regulation

Page et al. [35] measured relationship boundary preservation concerns with a single item. In our survey, we expanded this construct to more broadly cover various aspects of relationship boundary regulation, and measured it with eight items. Half of the items were worded as negative impacts on the relationship and the others as positive impacts. In each set of items, one item represented overall negative or positive relationship change and the other items were more specifically focused on informational and behavioral changes in the relationship. Upon analyzing this construct, we found that it actually consisted of two factors: Relationship Boundary Preservation Concerns (BPC) and Relationship Boundary Enhancement (BE). We conducted a

Confirmatory Factor Analysis (CFA) to test whether this two-factor solution fit the relationship boundary regulation data better than a one-factor solution. A graphical representation of the one- and two-factor solutions is shown in Fig. 2. The strength of CFA is that it allows us to separate the intended construct from measurement errors and additional causes through covariance analysis.

The left side of Fig. 2 shows the one-factor solution. Note that the item "I'm worried others will use <Platform> in a way that is out of line with our relationship," has a loading < 0.70, which indicates bad fit. The average variance extracted (AVE, a measure of the amount of the variance of the items predicted by the factor) is acceptable (AVE = .533), but not particularly high. Moreover, the model *CFI* = 0.638 and *TLI* = 0.494, which are far below accepted thresholds of 0.96 and 0.95, respectively [16]. The right side of Fig. 2 shows the two-factor solution. All factor loadings of this model are 0.80 or above, indicating a good fit for all items. Moreover, the AVEs are .769 and .767, which is higher than the one-factor model. For the two-factor model, *CFI* = 0.989 and *TLI* = 0.984, which is well above the accepted thresholds. Further inspecting the two-factor model, we find that while relationship boundary preservation concern and relationship boundary enhancement are significantly correlated ($r = -0.277$), this correlation is lower than the square root of the AVE, indicating discriminant validity (meaning that the two factors are substantially distinct from each other to warrant separate factors).

Better fit and discriminant validity indicate that a two-factor model is warranted. We conducted two formal statistical analyses that showed this solution significantly improves upon the one-factor solution. The first test evaluates whether the correlation between the two factors is significantly lower than one. The rationale behind this is that a two-factor solution, with a perfect correlation between the two factors, is statistically equivalent to a one-factor solution. This test was found to be strongly significant $\chi^2(1) = 518.671$, $p < .0001$. The second test is a likelihood ratio test between the one- and two-factor solutions. This test was also strongly significant $\chi^2(1) = 337.836$, $p < .0001$.

In summary, we measured relationship boundary preservation concern and relationship boundary enhancement with four items each. The items and their loadings in the final model are in Table 1. Consequently, we also update our original hypotheses 1 and 2:

H1a: Relationship Boundary Preservation Concerns negatively impact social media adoption and usage.

H1b: Relationship Boundary Enhancement positively impacts social media adoption and usage.

H2a: FYI communicators have lower Relationship Boundary Preservation Concerns on social media.

H2b: FYI communicators perceive higher Relationship Boundary Enhancement on social media.

3.6 FYI communication style

Page et al. [34] developed two aspects of FYI communication style: "preference for the FYI style for sharing my location" (FYImy) and "preference for the FYI style for learning others' locations" (FYIother), and measured each with three items. We used the same items in our survey but adapted them to the context of social media in general. The items and their loadings are presented in Table 1.

4 RESULTS

4.1 Confirmatory Factor Analysis

We conducted a Confirmatory Factor Analysis (CFA) that can be used for exploratory purposes by comparing various potential model configurations [19]. We examined the validity and reliability scores of our constructs. All items were retained and shared at least 44% of their variance with their designated construct. Results are presented in Table 1, and correlations are presented in Table 2.

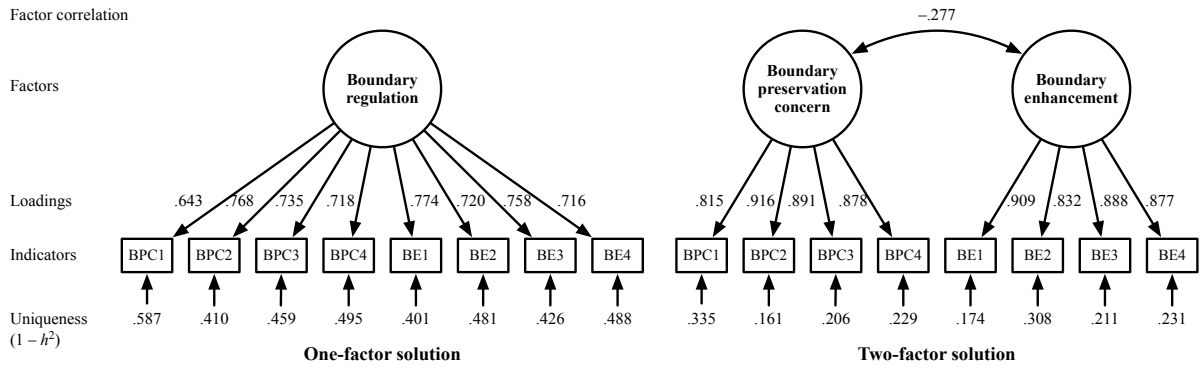

Figure 2: The one-factor and two-factor solutions for our items measuring relationship boundary regulation. Numbers slightly diverge from Table 1 because BPC and BE are tested in isolation (without FYImy and FYIother).

Table 1: Confirmatory Factor Analysis of the Constructs Measured

Subjective Construct	Items	Load.
Relationship Boundary Preservation Concerns (BPC) AVE: 0.769	I'm worried others will use <Platform> in a way that is out of line with our relationship.	0.814
	<Platform> exposes information that will negatively affect my relationship with others.	0.916
	I'm concerned that using <Platform> will trigger changes in behavior that hurt my relationships.	0.892
	It is likely that using <Platform> will negatively impact my relationships with others.	0.878
Relationship Boundary Enhancement (BE) AVE: 0.767	Using <Platform> will improve my relationships with others.	0.908
	<Platform> supports new behaviors that will improve my relationships.	0.835
	Using <Platform> enhances my relationships with others by keeping us better informed.	0.890
	I feel others will use <Platform> in a way that pushes our relationship in a positive direction.	0.873
FYI for my communication (FYImy) AVE: 0.657	Others should be able to find out about me when they feel they need to.	0.724
	I want others to know what I'm up to without my having to bother to tell them.	0.860
	I would prefer to share about myself with everyone in case anyone wants to know.	0.841
FYI for others' communication (FYIother) AVE: 0.537	I want to know what others are up to without having to bother them by asking.	0.663
	Rather than wait for them to tell me, I would like a way to find out about others whenever I need.	0.701
	It would be useful to me if others shared about themselves to everyone in case anyone wants to know.	0.826

To ensure the convergent validity of constructs, we examined the AVE of each construct, which were all higher than the recommended value of 0.50. Further, to ensure discriminant validity, we checked whether the square root of the AVE of each construct was lower than its correlations with other constructs. This was the case for all constructs, except that FYImy and FYIother showed extreme multicollinearity ($r > 1$).[1] In subsequent analyses, we only include FYImy, and validated that the results presented in the remainder of this paper also hold for FYIother.

Table 2: *r*s between subjective constructs and use

BPC	–0.208			
BE	0.463	–0.277		
FYImy	0.304	–0.052	0.409	
FYIother	0.308	–0.083	0.368	1.087
	Use	BPC	BE	FYImy

4.2 Multi-level Structural Equation Modeling

We subjected the single item measuring use and the three latent constructs for BPC, BE, and FYImy, to structural equation modeling, which simultaneously fits the factor measurement model and the structural relations between factors and other variables. Our model uses 11 measurement parameters, plus 14 structural parameters, which totals 25 parameters. With 113 participants, this may appear to fall below the established rule of thumb that 5-10 cases per parameter are sufficient for analysis [6,47]. However, our data has a multi-level structure, with BPC, BE, and "use" measured four times per participant (once for each platform). Rules of thumb for multi-level models are not available, but we essentially have four times the amount of data for eight of the measurement parameters and 12 of the structural parameters, making our sample size adequate in relation to the complexity of our model.

A robust estimator is used because the distribution of the "use" variable is highly non-normal. In our model, use was regressed on BPC and BE, which was in turn regressed on FYImy. We first ran a multiple-group model to test whether these regression parameters differed per platform (Facebook, Twitter, LinkedIn, and Instagram). We found that platform only had main effects on use, BPC, and BE (i.e., no interaction effects were found). Hence, our final model is a single multi-level structural equation model, see Fig. 3. The final model has an acceptable [2] fit: $\chi^2(78) = 258.685$, $p < .0001$; RMSEA = 0.072, 90% CI: [0.062, 0.081], CFI = 0.963, TLI = 0.952.

4.2.1 Hypothesis tests. We first focus on testing our hypotheses. The model shows that participants with an FYI communication style show reduced relationship boundary preservation concerns ($\beta = –0.246$, $p < .001$; H1a confirmed) and increased perception of boundary enhancement ($\beta = 0.528$, $p < .001$; H1b confirmed). In turn, controlling for platform, relationship boundary preservation concern is associated with decreased use ($\beta = –0.219$, $p < .001$; H2a confirmed), while boundary enhancement is associated with increased use ($\beta = 0.439$, $p < .001$; H2b confirmed).

4.2.2 Differences per platform. Participants had significantly lower relationship boundary preservation concerns with LinkedIn than with the other platforms (all $p < .001$), followed by Instagram, which is significantly lower than Facebook; $p = .006$. Participants had the highest relationship boundary preservation concerns with Facebook and Twitter. Participants perceived significantly higher relationship boundary enhancement with Facebook and LinkedIn than with Twitter and Instagram (all $p < .001$). Finally, controlling for relationship boundary preservation concerns and enhancement, participants use Facebook significantly more than any of the other platforms, followed

[1] Correlations between latent factors are corrected for measurement error and may thus exceed 1.

[2] A model with a non-significant chi-square ($p > .05$) has no significant residual error, but this statistic is often regarded as too sensitive. Hu and Bentler [16] propose cut-off values for other fit indices: *CFI* > .96, *TLI* > .95, and *RMSEA* < .08, with the upper bound of its 90% CI below 0.10.

by Instagram, Twitter, and LinkedIn (all $p < .001$, except between Instagram and Twitter: $p = .004$). Platform, BPC and BE are together able to explain 41.3% of the variance in use.

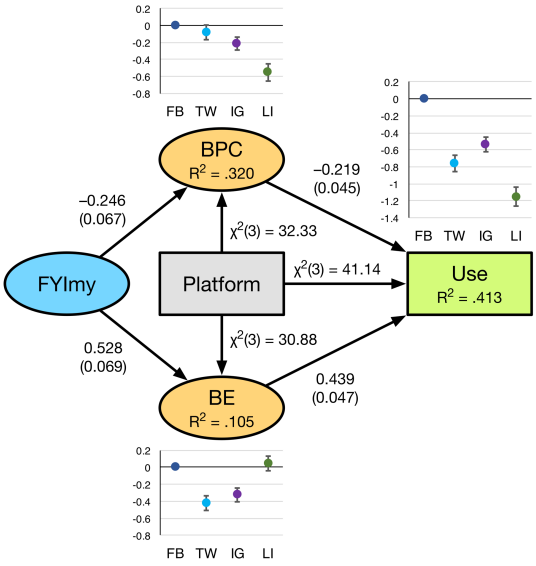

Figure 3: Model of structural relationships in our study. Factor scores are standardized and fixed to zero for Facebook (FB). Error bars and values in parentheses are SEs.

4.3 Additional Effects Per Platform

Aside from the results presented above, there are a few relationships between the measured constructs and behaviors that are specific to each platform. We test these relationships by running a separate model for each platform. The number of participants *N* for these models is still 113, because each participant answered questions for all platforms. These four models retain the same basic structure as reported in Fig. 3.

4.3.1 Facebook. Facebook is the most-used platform (only 11 out of 113 had no account, while 56/113 used it "almost constantly", which is more than any other platform; all $p < .001$). In terms of relationship boundary regulation, Facebook users face a dilemma: the platform causes the highest relationship boundary preservation concerns (as mentioned in Section 4.2.2, significantly higher than Instagram, $p = .006$ and LinkedIn, $p < .001$), but also scores very high on relationship boundary enhancement (significantly higher than Twitter and Instagram, both $p < .001$). On Facebook, the FYI communication style is positively associated with the participant's number of friends ($\beta = 0.273$, $p = .001$). Also, participants with more friends tend to use this platform more often ($\beta = 0.338$, $p = .002$).

4.3.2 Twitter. Twitter has the most non-users in our sample (32/113 had no account, and 15/113 had an account but never used it, which is more users than any other platform; all $p < .01$). Moreover, the fact that many Twitter users only use it occasionally (73/113 participants used it less than once a day) reduces opportunities for relationship boundary enhancement. As mentioned, this is significantly lower than for Facebook and LinkedIn, both $p < .001$). Finally, its relative lack of relationship boundary preservation (BPC is significantly higher than LinkedIn, $p < .001$) may be due to the "open" nature of the Twitter network (by default, anyone can follow you). On Twitter, the FYI communication style is positively associated with the frequency with which participants share their location with their tweets ($\beta = 0.899$, $p = .008$) and with their number of followers ($\beta = 0.336$, $p = .004$). Furthermore, participants with more followers are more likely to use this platform more often ($\beta = 0.337$, $p < .001$).

4.3.3 Instagram. Instagram shows a U-shaped usage pattern (see Fig. 1): participants in our study did not have an account (32/113), used it "several times a day" (21/113), or "almost constantly" (32/113). On Instagram, the FYI communication style is positively associated with the participant's number of followers ($\beta = 0.190$, $p = .013$), and participants with public profiles have higher relationship boundary preservation concerns ($\beta = 0.480$, $p = .077$). Also, participants with more followers tend to use Instagram more often ($\beta = 0.449$, $p < .001$).

4.3.4 LinkedIn. LinkedIn users are most likely to use the platform only occasionally. Specifically, 87/113 used it less than once a day which is more than any other platform (all $p < .05$). Despite its significantly lower relationship boundary preservation concerns (all $p < .001$) and its high level of relationship boundary enhancement (significantly higher than Twitter and Instagram, both $p < .001$). On LinkedIn, participants with more connections have a higher tendency to use the platform ($\beta = 0.654$, $p < .001$).

5 DISCUSSION

5.1 Implications

Our study explores whether the concept of relationship boundary regulation can be operationalized and used to predict social media usage. This is a higher-level conception of privacy that prior research has shown to be the root of typical privacy concerns used in many studies (e.g. worrying who sees what, self-presentation concerns [35]). Our work takes a step towards overcoming the widely acknowledged privacy paradox for predicting social media use. The scales developed in this study can be used by privacy researchers to gauge concerns and to predict adoption and usage behavior. In fact, our work can complement existing scales that have identified low-level privacy concerns (e.g., concern about access, control [17]) by exploring the extent to which each low-level concern can be traced to overall relationship boundary regulation concerns. Moreover, although relationship boundaries have been identified as the most relevant for understanding privacy in social media [35, 52],

future research should explore the extent to which operationalizing additional boundaries (e.g., temporal, identity) would enhance the model, as well as compare this against other explanations and predictors.

Furthermore, we found two conceptually distinct aspects of relationship boundary regulation: Relationship Boundary Preservation Concerns (BPC) and Relationship Boundary Enhancement (BE). This suggests that researchers should look at both the worries and the hopes engendered by a social media platform. Both have an impact on the adoption decision and they must be balanced against one another. In fact, this is in line with the privacy calculus framework, where costs are weighed against benefits [23], and aligns with research that suggests it may be the most productive approach to explaining the privacy paradox [15]. These findings support the idea that it is important to look beyond just privacy concerns—having low concerns is not enough to trigger adoption if the platform projects a low chance of improving one's relationships. An example of this is Instagram, which has significantly lower BPC than Facebook, but also significantly lower BE, which may help explain why the adoption levels are still much lower than for Facebook [43]. We encourage privacy researchers and designers to take a balanced approach to understanding privacy in social media by measuring both the positive and the negative sides of the relationship boundary regulation process using our developed measures of relationship boundary preservation concerns and boundary enhancement. Looking forward, researchers should consider various populations who may each have different concerns towards and perceptions of value on each platform. This study is an initial exploration with one sample, but future research should generalize these findings and examine specific populations and contexts to understand potentially differing perceptions of relationship boundary regulation.

We also reveal the influence of each platform on relationship boundary regulation and use, which sheds light on how the platforms trigger different levels of concern and enhancement perception. It is important to note in Fig. 3, that the graph of the effect of platform on use is controlling for relationship boundary preservation concerns and relationship boundary enhancement. Fig. 4 shows the total effect of platform on use, part of which (around 15.6% of it) is mediated by relationship boundary preservation concerns and relationship boundary enhancement.

Considering the effects of platform on boundary regulation and use, we summarize the different levels of use, relationship boundary preservation concern and relationship boundary enhancement for each platform, as well as design opportunities for researchers to improve each.

5.1.1 Facebook. With its high adoption rate and usage frequency, Facebook's ability to support interaction with a large community of friends arguably outweighs the extreme context collapse that this interaction entails. Facebook could potentially increase its usage—especially among low-FYI users—by providing better means to protect relationship boundaries. For example, by following design suggestions to adaptively increase the visibility of audience selection and provide disclosure limitation features [54].

5.1.2 Twitter. Twitter has tried to resolve its relative lack of relationship boundary preservation by allowing users to have a "private" account that makes tweets accessible only to the user's explicitly accepted followers, but this does not seem to have been enough. Twitter still has the lowest perceived opportunities for improving relationships and is on par with Facebook for highest risk of harming relationships. This contributes to it being the platform with the lowest adoption in our study. Designers should investigate how to strike a balance between the risks of a very public account versus the reduced opportunities for relationship boundary enhancement that may result from a private account.

5.1.3 Instagram. Instagram is similar to Twitter when it comes to relationship boundary preservation concerns and relationship boundary enhancement, and on both platforms FYI communication style is related to the number of followers users tend to have. These similarities are unsurprising given that Instagram and Twitter have a very similar follower/followee dynamics. Moreover, Instagram has a similar messaging feature to communicate with individual users. Unlike Twitter, Instagram allows privacy to be adjusted for each individual post. This may be why, relative to Twitter, Instagram is bit higher in relationship boundary enhancement and lower in relationship boundary preservation concern (although neither of these differences is significant).

5.1.4 LinkedIn. LinkedIn's lower usage frequency may be due to its status as a professional network; professional communication through social media may not be as frequent as personal communication for most people. The reason LinkedIn scores very low on relationship boundary preservation concern may be due to a common perception that these are (or should be used as) business relationships—from the start LinkedIn has marketed itself as a professional rather than purely social platform [41]. Furthermore, LinkedIn scoring high on relationship boundary enhancement may be because it facilitates connection requests by utilizing external connections (e.g., a business relationship or a formal introduction by a third party). Designers should look into whether other platforms could use a similar dynamic to reduce BPC and increase BE.

5.2 Non-FYI communicators

Boundary preservation concerns and boundary enhancement mediate the effect of FYI-communication style on use (total effect: $\beta = 0.286$, $p < .001$). For comparison: the difference in social media use between a person with low FYI (5th percentile) and a person with high FYI (95th percentile) is almost as large as the difference between Facebook and

LinkedIn. As such, we suggest that social media interaction design patterns that cater to "non-FYI communicators" (i.e., users with an aversion to the FYI communication style) could significantly reduce relationship boundary preservation concerns, increase relationship boundary enhancement, and ultimately increase the use of social media.

Non-FYI communicators do not want just anyone to know about their activities [34], so they would benefit from being able to explicitly accept or reject requests to connect. This functionality is most prominent in LinkedIn, followed by Facebook, and then Twitter and Instagram. Non-FYI communicators also prefer to connect in real time and one-on-one [34]. Facebook's chat functionality serves this preference most directly, followed by DMs in Twitter, Instagram Direct, and InMail in LinkedIn. One-on-one communication could be promoted even more in these platforms though. For example, Twitter could offer its Direct Messaging feature as an equal alternative to the @-reply.

To increase value for non-FYI communicators, designers should concentrate on how to better integrate the one-on-one experience with the social functionalities of more public wall posts. While non-FYI communicators tend to dislike public wall postings, such posts are nevertheless important, because they are conducive to passive information consumption, which has been shown to increase ambient awareness. This awareness plays a role in maintaining relationships, as well as the exchange of organizational knowledge [25]. To support awareness without overwhelming non-FYI communicators, designers could provide a way for posters to flag new posts that they want to call attention to (e.g., major life events). These posts could then be sent directly to non-FYI communicators, who could then respond directly. This could mediate between FYI and non-FYI individuals (who do not want to wade through their feed).

We further point out that Page et al. [34] originally conceived of two separate factors to represent FYI communication style (i.e., a preference for FYI to communicate my status versus communicating others' status). However, our study found them to be conceptually equivalent. Namely, someone who prefers to communicate their own status in a FYI way, also prefers to have others communicate their own status in the same way. This suggests one factor can be used in place of the other when measuring FYI communication style. It also suggests that designers can often assume that one's communication preference stays the same regardless of whether the person is sharing or consuming information.

Nonetheless, communication style will vary from person to person and researchers must take this into account when studying privacy and adoption in social media and when evaluating new features. Communication style could also vary by demographics or life phases, and researchers and product developers should aim to understand the communication style of their target audience. This study takes an initial step in that direction. Future work should evaluate the results on a larger nationally representative sample to better generalize the results of this study.

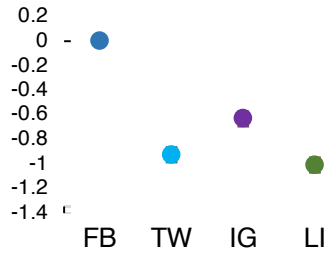

Figure 4: Total-effect differences in use between platforms.

5 CONCLUSION

In this paper, we examined the effects of FYI communication style and relationship boundary regulation on the adoption and use of social media platforms. In doing so, we overcome the commonly cited privacy paradox and are able to tie privacy to adoption behaviors. A key component of overcoming the paradox is to focus on boundary regulation and, specifically, both the benefits and drawbacks of social media use, rather than just privacy concerns. Moreover, we find significant differences between social media platforms in terms of boundary preservation, boundary enhancement, and use. We argue that social media platforms can further reduce relationship boundary preservation concerns and improve relationship boundary enhancement by focusing on supporting non-FYI communicators.

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