The current reference for this work is as follows:

> *Paul Benjamin Lowry, Gregory D. Moody, and Sutirtha "Suti" Chatterjee (2017). "Using IT design to prevent cyberbullying," ***Journal of Management Information Systems (JMIS)*** (accepted 13-June-2017)
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Using IT Design to Prevent Cyberbullying

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Using IT Design to Prevent Cyberbullying

ABSTRACT

The rise of social media has fostered increasing instances of deviant behavior. Arguably, the most notable of these is cyberbullying (CB), which is an increasing global concern because of the social and financial ramifications. This has necessitated a new line of research with the aim of understanding and preventing CB. Although much progress has been made in understanding CB, little is known about how to prevent CB, especially through the information technology (IT) artifact. Based on the need for a better causal theory and more effective empirical methods to investigate and mitigate this phenomenon, we leverage the control balance theory (CBT). Our model examines the causes of CB from several novel angles, including (1) the strong nonlinear influence of control imbalances on CB and (2) using the concept of fit to understand how different design features of information technology (IT) artifacts influence factors such as deindividuation and accountability, thus affecting control imbalance. Using an innovative factorial survey method that enabled us to manipulate IT design features to obtain a nuanced view, we tested our model with 507 adults and found strong support for our model. The results show that IT design features create a strong CB opportunity for individuals who perceive that they are controlled by others. Whether this perception is real or imagined, it creates a sense of vulnerability, prompting them to engage in CB. We can thus propose specific IT design feature manipulations that can be used to discourage CB. These results should have salient implications for researchers and social media designers, especially in developing social media networks that are safe, supportive, responsible, and constructive.

KEYWORDS

Cyberbullying (CB), control balance theory (CBT), social anonymity, anonymity, monitoring, evaluation, control surplus, control deficit, control balance, IT CB prevention capability (ITCBPC), nonlinear mediation, nonlinear moderation, U-shaped curve, inverted U-shaped cure

> *The story of 13-year-old Megan Meier brought notoriety to the subject of cyberbullying when she committed suicide after being harassed through a popular social networking site (ABC News, 2007). The cyberbully, a mother of Megan's former friend, created a false identity to correspond with and gain information about Megan, which she would later use to humiliate Megan for spreading rumors about her daughter.* [150, p. 277]

INTRODUCTION: THE PROLIFERATION AND THREAT OF CYBERBULLYING

The proliferation of the Internet has given rise to the misappropriation of online technologies and websites [21]. One particular area of concern is the explosive growth of social media platforms (e.g., Facebook, Weibo, WeChat, Twitter, and Instagram) that support social networking and interpersonal communication over the Internet [59]. Although social media yields some benefits, ethical challenges related to social media have raised widespread concerns. For example, the rise of social media has resulted in significant problems involving privacy and self-disclosure [51, 61, 75, 106], cyberloafing [62]; and addiction, anxiety, loneliness, and depression [7, 23, 56, 85, 117]. Collectively, these negative outcomes, often described as *deviant behaviors*, are a cautionary tale in the widespread proliferation of social media.

Perhaps the most commonly reported online deviant act is cyberbullying (CB) [16, 35, 36, 51, 53, 80], which has serious repercussions, as illustrated in the Megan Meier incident. CB is defined as "willful and repeated harm inflicted through the medium of electronic text" [96, p. 152] with outcomes that can be "…intense, frequent, unsuspecting, and seemingly difficult to stop" [120, p. 2704]. Social media facilitate CB because it allows to users interact, including posting comments, videos, and photos on another user's page and organizing groups and events [68]. The lack of direct repercussions and the personal sense of anonymity also encourage CB [78, 80]. For example, it is easier to exact revenge in a digital environment because there are fewer immediate barriers [9]. Although some CB behaviors are relatively benign, others, such as revenge porn [130], can be extremely damaging and may lead to serious outcomes, such as suicide [150]. Although some people consider CB to be an issue primarily related to adolescents, there is considerable evidence that it affects other age groups [120]. CB has also spread from purely social contexts to business contexts. For example, online customer service agents often fall prey to online customer bullying, causing them extreme stress and discomfort [30].

Given these concerns, researchers have recognized the need for additional research focused on the causes and prevention of CB [35]. Because CB is a technology-mediated phenomenon, we argue that one way to deter CB is through effective technology design. Although some notable efforts have been initiated, several gaps remain, especially in designing technology that can prevent such behaviors [10]. This section summarizes the existing gaps and opportunities in CB research.

One key shortcoming of current CB studies is the lack of a strong theoretical foundation [38, 142, 158]. For example, there are a limited number of CB studies that build on logical hypothesis development, and much CB research has been conducted in the absence of theory [158]. Espelage et al. [38] make a similar case, noting the lack of theoretical applications in CB research and calling for a greater infusion of theory into the study of CB.

Other researchers have noted the current limitations in CB research and proffered avenues for future engagement. For example, in a recent meta-analysis of CB research, Kowalski et al. [66] point out certain existing shortcomings that need to be addressed, such as (1) a better understanding of situational factors, (2) research designs that capture *power differentials* between the perpetrator and the victim, (3) analyzing CB using structural equation modeling (SEM) techniques, and (4) going beyond nonexperimental methods to investigate CB. Similarly, Bauman and Bellmore [8] argue there are key challenges and deficiencies in current CB research: (1) researchers are struggling to keep up with recent technological innovations (e.g., newer social media), where arguably, the media plays an important role in the perpetration of CB; (2) researchers are unable to go beyond convenience samples that inhibit generalization; and (3) there is a lack of focus on *designing programs to deter CB* due to the aforementioned theoretical and methodological deficiencies.

As further argued by other researchers [e.g., 44], CB is a relatively new phenomenon and researchers do not have a good theoretical understanding of contextual factors, such as the technological environment, that play a role in the perpetration of CB. They also emphasize there is a lack of CB prevention programs, an issue which is consistent across calls for CB research. In fact, technology and media advances have far outrun research on CB, which further undermines theoretical understanding [1].

All of these observations are summarized in [158], which calls for the following research improvements: (1) ensuring that CB phenomena are grounded in a strong theoretical base by using new and insightful theoretical perspectives, (2) using novel research methods to address the CB phenomena, and (3) engaging in causal modeling to determine the key factors associated with CB to develop interventions. This observation is largely supported by other scholars, who have observed that CB research faces notable challenges, including theory, conceptualization, and measurement [89, 136]. In fact, researchers vociferously support the previously summarized shortcomings of CB research, and they note that CB research is nascent and call for scholars to theorize more deeply about this phenomenon using more sophisticated empirical methods, especially, beyond cross-sectional surveys [33].

Given the rapid technological advances in social media, there is not only a need to infuse a sophisticated causal theory into CB prevention, but also to "consider *emerging methods and strategies* that are relevant to new and emerging media, online behaviors, and the online spaces in which young people congregate" [emphasis added] [137, pp. 197–198]. The emergence of new methods to investigate CB is crucial because to date, this area of research has primarily included self-reported surveys, which have their documented weaknesses [39]. Given the prior observations that technology facilitates deviant behavior [21, 168], it is imperative to understand how technology can be used to prevent CB.

In this context, it is also useful to note that the existing studies investigating the role of technology in deviant behavior have often lumped CB "with other forms of computer-mediated misconduct, such as digital piracy, password hacking and phishing, Internet luring, malware authorship, online auction fraud, and the downloading and distribution of child pornography" [5, p. 373]. Therefore, there is a need for a singular focus on CB, and from an information systems (IS) research standpoint, this should include a causal examination of the role that *IT plays in deterring CB* and its associated factors.

We aim to address these issues in two ways. First, we offer a new theoretical perspective to investigate CB: *control balance theory*, or CBT [146, 148, 149]. CBT considers the concept of control imbalance, which is particularly salient to CB because power and control have often been cited as important concepts within the literature, but ironically, they have never been theoretically nor empirically addressed [38]. Given that control imbalance between the perpetrator and the victim in CB has been argued to be a key CB factor [24], together with the call to investigate power differentials between the perpetrator and the victim [66], it is crucial to determine if and how technology can reduce CB.

Our key aim, therefore, is the design and manipulation of IT that has a downstream effect on control imbalance; this necessitates the establishment of a strong causal theory linking the technological, social, and control factors in the investigation of CB. One important aspect of our causal theory is that we empirically investigate nonlinear relationships, which is an important addition to CB studies that have previously focused mostly on linear investigations. CBT becomes especially useful in this regard because it facilitates nonlinear analyses [146]. Given that IT often induces nonlinear and disruptive effects [145], CBT seems an appropriate lens with which to empirically investigate the influence of IT on CB.

Second, this paper goes beyond the traditional experimental or survey-based approaches used in CB research and instead focuses on the innovative use of the factorial survey methodology (FSM) recently applied to graphical user interface studies [e.g., 155].[i] We applied FSM to analyze social media pages and various realistic scenarios of CB. Improving the methodological sophistication in CB research allows for the examination of IT design features that can cause or inhibit CB, which contributes to an understanding of how to mitigate CB through both policy and IT design-based prevention [17]. Formally, our research question is as follows:

> *RQ: How can researchers design technology artifacts that can prevent control imbalances in possible CB perpetrators, thus reducing CB?*

CONTROL BALANCE THEORY (CBT)

CBT [146, 148, 149], a criminological theory, introduces the key concept of control, which is fundamental to CB, but noticeably absent in current CB research [38]. A key issue in CB research is *control imbalance*, which is caused by the power differential between the victim and the CB perpetrator [110, 116]. Much of the research on CB shows that such activities arise from a power differential between the attacker and the victim [e.g., 32, 87]. Others concur, arguing that "[CB] is a systematic **abuse of power** which occurs through the use of information and communication technologies (ICTs)" [emphasis added] [136].[ii] Research [83] explains why the idea of control imbalance is crucial to understanding CB:

> … [CB] *is centered on the systematic abuse of **power and control** over another individual who is perceived to be vulnerable and weaker, and that this **power imbalance** makes it difficult for some victims to defend themselves.* [emphasis added] [p. 323]

This abuse of power often prompts future retaliation from the victim.[iii] In short, as the balance of power is repeatedly abused (or retaliated against) in CB [136], CBT becomes appropriate for investigating this phenomenon. In CBT, *deviance* is defined as "any behavior that the majority of a given group regards as unacceptable or that typically evokes a collective response of a negative type" [146, p. 124].

The major idea proposed by CBT is that when individuals feel the ratio of control that they exert on others is mismatched (imbalanced) with the control that is exerted on them, they have an increased motivation to act in a deviant manner [146]. This is illustrated by the concept of the *control balance ratio* (CBR), the ratio between the amount of control exerted on others and the exposure to control on the individual by others. In other words, $\mathbf{CBR} = \frac{\textbf{perceived control exerted}}{\textbf{perceived control experienced}}$

Generally, deviance increases with CBRs that depart from a balance control ratio of 1 (capturing imbalance). Conversely, as the control ratio approaches a balanced ratio (i.e., 1), the motivation to engage in deviance decreases. CBT further proposes that people react in a deviant manner because they perceive or experience a control imbalance with respect to their victims [164]. CBR<1 is referred to as a *control deficit* while CBR>1 is referred to as a *control surplus*.

Perhaps one of the greatest advantages of CBT is its facilitation of the prediction and analysis of deviant behaviors in a nonlinear fashion [146]. CBT argues that deviance decreases as CBR approaches 1 and increases as CBR moves away from 1. Notably, CBT differentiates between two kinds of deviance: a CBR of greater than 1 or a CBR of less than 1. A CBR>1 stimulates predatory deviance in which a powerful individual abuses his or her power over a less powerful one; whereas, a CBR<1 stimulates defiant or retaliatory deviance in which a less powerful individual reacts to the perceived or actual vulnerability that stems from a more powerful individual [99].

The inherent nonlinear nature of deviance captured by CBT aligns well with increasing calls for *nonlinear* investigations into IS phenomena [156] and increasing criticism of the tendency of researchers "to model phenomena as if they were linear in order to make them tractable" [3, p. 233]. This is a serious concern because "the omission of nonlinear relationships in model testing [is] . . . potentially *misleading*, and therefore . . . a possible *limitation*" [emphasis added] [145, p. 842].

Apart from CBT's ability to support the investigation of nonlinearity in CB, CBT is useful and generalizable, as noted in [101], because it is designed to explain "all forms of deviance committed by all types of deviant actors" [p. 324]. Criminological researchers have argued that it is "more nuanced and elaborate than previous control theories" [34, p. 271]. Consequently, CBT has been widely and successfully applied to many areas of deviance, including sexual offences [164], assault and predation [99], corporate crime and exploitation [102], general victimization [100], academic dishonesty [26], and police deviance [50]. Crucially, CBT has not been applied to computer-dependent behaviors such as CB [41]. We aim to be among the first to implement CBT to investigate CB.

EXTENDING CBT TO THE CB CONTEXT

Deindividuation and Accountability

Whereas CBT highlights the central construct of control imbalance and how it affects CB, it is unknown how control imbalance itself is linked with other constructs, especially in a technological context such as social media. From an IS standpoint, it would be particularly beneficial to determine whether technology influences this phenomenon. Accordingly, we introduce two key concepts that are arguably pivotal antecedents to control imbalance and that are influenced by technological design and features. These two salient concepts are *deindividuation* and *perceived accountability*.

Deindividuation can be defined as a "decrease in self-observation, self-evaluation, and concern for social comparison and evaluation" [22, p. 3044]. There are two reasons why deindividuation becomes central in this context. First, deindividuation has been consistently associated with deviant behavior [133]. Second, deindividuation is rampant in virtual environments, including social media [48]. Specifically, it has been argued that the virtual environment creates deindividuation effects that ultimately engender deviant behavior [31, 108], which is similar to CB [48]. Thus, it is natural to infer that deindividuation has a strong link to control imbalance.

The other construct is *perceived accountability*, which is the perception of “the implicit or explicit pressure to justify one’s beliefs and actions to others” [143, p. 8]. Recent research has stressed the importance of accountability in virtual environments [155][iv] and has also highlighted that perceptions of accountability are often lowered in virtual environments [160]. Because perceived accountability includes the need to justify one’s actions to others, it is highly salient in the investigation of deviant behaviors because these are often not justifiable [139]. In fact, as accountability increases, demands on ethical behavior become more prominent, leading to more conformist and less deviant behaviors [47]. Thus, if accountability leads to less deviant behaviors and control imbalance leads to more deviant behaviors, a possible negative relationship could exist between accountability and control imbalance.

Similarly, GPS-based network applications are valuable because they promote locational accountability [65]. This view is reinforced in [127], noting that “considerations of accountability have taken on…particular resonance in the contemporary information age” [p. 27]. The notion of accountability encompasses issues such as “ethics of design, access controls, privacy, copyright infringement, identify theft, intellectual property, and fair information use” [p. 27]. Many of these issues are fundamental to the construction of sociotechnical systems that attempt to give humans a voice and address their concerns in the sociotechnical systems [122].

Perhaps the most significant support for including accountability as a focus of investigation can be found in the observations of Sauder and Espeland [123]:

> *Accountability has become an expansive and elastic term for transparency, improving decision making, containing bias, and enhancing productivity. Audits, assessments, measurement-driven instruction, management by objective, new public management, total quality management, risk assessment, clinical guidelines, and best practices are a few of the strategies devised for achieving accountability. All rely on performance measures such as service statistics, indicators, standardized test scores, score cards, ratings, cost–benefit ratios, and rankings.* [p. 64]

One can thus infer that accountability is crucial to sociotechnical systems such as social media. Specifically, the scope of our study—cyberspace and social media—is ripe with accountability issues [74], and this is highly relevant to sociotechnical IS research.

The IT Artifact in CB

Whereas CBT highlights the central construct of control imbalance (captured by CBR <>1) and how it affects CB, it is unknown how control imbalance itself is linked to other constructs, especially in a technological context. From an IS standpoint, it would be particularly beneficial to determine whether technological features can influence the abovementioned constructs of accountability and deindividuation, both of which are arguably salient in deviant behavior. Specifically, key IT design factors that increase accountability and reduce deindividuation can influence the perceptions of control imbalance. Although technology can facilitate deviance, there is evidence that properly designed technology can inhibit deviant behavior [21, 168]. In particular, it is important to note whether IT provides an overarching capability that ultimately diminishes the perpetrator's control imbalance, thus reducing CB intentions.

The notion of IT providing an overarching capability for action is not new to IS research, but it has been primarily applied in strategic and organizational contexts. For example, a study [14] indicated that various IT resources could be combined to allow an organization to achieve and leverage a competitive advantage. We contend that if IT can provide an overarching capability for organizations, logically, it should be able to do the same for individual IT users. For example, for a user, IT could provide the ability to identify others while also being subjected to monitoring by others. These two abilities together could lower engagement in deviant activities.

Thus, there is a need to understand which IT design features affect and reduce the key construct of control imbalance. Accordingly, building upon recent research, four fundamental features of IT artifacts are crucial: promotion of identifiability, monitoring awareness, evaluation awareness, and social presence awareness [155]. Arguably, the ability to implement such IT design features has strong implications for deviant behavior [154], which makes it salient to the central concept of control imbalance. These fundamental characteristics are briefly discussed below.

Identifiability

We define *identifiability* as the degree to which others have knowledge of a person's online interactions [78].[v] An increase of identifiability means that an individual can be easily known [109]. IT can be designed to promote identifiability [78]. Because accountability can be understood as “being answerable to audiences for performing up to certain prescribed standards, thereby fulfilling obligations, duties, expectations, and other charges” [124, p. 634], when people can be identified, they become more accountable for any action they perpetrate. If IT promotes heightened identifiability in an online environment, then individuals become cognizant of the scope and ramifications of their own behavior and the behavior of others [49, 93].

Monitoring Awareness

Monitoring awareness is the recognition that one’s activities are being tracked [155]. This becomes important in the context of social networks because IT can often be designed to provide monitoring capabilities in a socially acceptable manner [152]. Social networks can have monitoring mechanisms built in that can track users and punish unacceptable behaviors [138]. Social media monitoring is becoming a key issue; even governments have begun funding projects to monitor public behaviors on social media [4]. If social media are developed with technological controls that increase individuals’ perceptions of monitoring awareness, they will likely heighten accountability for social media acts.

Evaluation Awareness

Evaluation awareness refers to the users’ knowledge that their actions are being logged and reviewed [151]. Although the perception that one is being monitored is salient to online social media behavior, the perceptions that those monitored actions will be evaluated to determine potential consequences adds another degree of accountability [71]. In general, evaluation awareness tends to make people less likely to engage in unacceptable behaviors [2]. Researchers have argued that as people become more aware that their actions are being evaluated, they are less deindividuated and behave in a more acceptable fashion [151, 154, 155].

Social Presence Awareness

The final IT design feature is that of *social presence awareness*, which is “the degree [to] which a person [is] perceived as ‘real’” [69, p. 297] and the level to which he or she is perceived to react to an actor

[131]. In the context of social media, social presence awareness refers to being knowledgeable about the actions of other users [115].

As Riedl et al. [115] further note, social presence awareness incorporates both knowledge of social ties and social emotions [73]. In the context of social media, it has been argued that IT features may also facilitate social presence awareness [28, 115]. When individuals experience a heightened social presence through technological interactions, they are forced to cognitively and systematically process the effect of their behavior on others, and thus, they are less deindividuated [155].

A Higher-Order IT CB Prevention Capability

The IT design features noted above will likely have a mitigating effect on CB. Given that control imbalance encourages CB, the key issue is to investigate how these IT design features can mitigate control imbalances via their effects on accountability and deindividuation. We propose that the IT features work concertedly to ultimately impede control imbalance, and we label these overarching IT capabilities as *IT CB prevention capability* (ITCBPC).

The key to conceptualizing ITCBPC is that the individual IT design features are neither mutually exclusive nor independent from one another [19]. Thus, the question is how we can increase social barriers in online platforms to create *an overall, higher-order capability that reduces control imbalance* by increasing accountability and reducing deindividuation. Rather than investigating the importance of the separate IT features on CB, which arguably leads to a more fragmented understanding, conceiving a higher-order capability allows us to holistically consider the salience of IT to the phenomenon of CB.

A related issue is how we can both conceptualize and operationalize ITCBPC. The answer to this question lies in the important notion of fit [157]. Seminally, Venkatraman [157] discusses different kinds of fit between variables, such as moderation, mediation, profile deviation, matching, covariance, and gestalt.[vi] Fit essentially reflects congruence between different variables and is defined as “the degree to which the needs, demands, goals, objectives, and/or structures of one component are consistent with the needs, demands, goals, objectives, and/or structures of another component” [90, p. 45]. In our context, fit among IT design features reflects a higher-order IT capability to inhibit CB.

Of all the fits discussed by Venkatraman [157], the notion of fit as covariance is the most relevant in our context. There are three reasons for this. First, covariance fit, unlike many others, can accommodate more than two variables, which we need because we use four IT design features. Second, covariance essentially captures the co-alignment of these multiple variables and inherently reflects the congruence among the IT design features that we propose, a notion that has been alluded to in prior research [19]. Third, covariance fit is a criterion-free fit in the sense that we do not need to refer to a third variable (e.g., as in the case of moderation) to conceptualize the fit. The influence of this fit on a third variable can be observed. Conceptually, we define an overall IT capability (i.e., ITCBPC) that reflects how IT influences CB by means of impacting control imbalance. This higher-order capability, ITCBPC, reflects the notion of IT-based controls, which has been argued to be a salient factor diminishing deviant behavior [21].

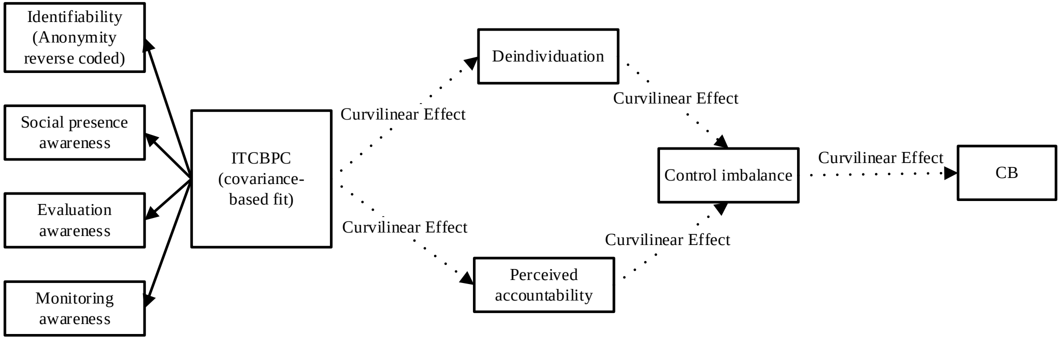
The Nature and Value of Covariance Fit

Fit as covariance is rarely applied in IS research [144]; therefore, we further explain and justify its use here. *Covariance-based fit*, also called covariance fit or fit as covariation, is “a pattern of covariation or internal consistency among a set of underlying theoretically related variables, and it can be best described through an illustration” [157, p. 435]. For example, Venkatraman [157] showed that the degree of internal consistency between different organizational variables positively impacted the performance of the organization. Covariance-based fit is actually the degree of alignment between two or more variables [161]. Unless this alignment occurs, favorable outcomes cannot take place. Venkatraman noted that unless various forms of resource allocation in an organization are internally consistent, favorable outcomes, such as performance, cannot take place. In many ways, this is intuitive. If the different resource allocation strategies work against each other, then performance is inhibited.[vii]

In our context, the four components are the first-order factors of identifiability, social presence, monitoring awareness, and evaluation awareness. Individually, they may not be compelling enough to understand how accountability/deindividuation (and ultimately, CBR) are affected by technology; however, combined into a second-order covariance-based construct, it is a more powerful and meaningful way to conceptualize this effect. What this also means is that the four components are technology capabilities that are not in conflict, but rather act in a synergistic manner, leading to desirable outcomes such as successful prevention of CB [167]. Importantly, fit as covariation is directly measurable and we do so to test our research.[viii]

In summary, there are multiple IT-induced factors that align to influence deindividuation and accountability and, thus, control imbalance online. By acknowledging the pivotal influence of control imbalance on CB and the important constructs of deindividuation and accountability, we can propose an extended CBT framework that incorporates an innovative conception of technology (as ITCBPC) within the context of CB. Figure 1 shows the theoretical model that guides the empirical study. Notably, from a methodological standpoint, this extended CBT model allows for the manipulation of technological design features to identify nuances in the relationships among the technology design features, deindividuation, accountability, and the control imbalances perceived by cyberbullies.

Figure 1. Extended CBT for CB



HYPOTHESES DEVELOPMENT

Here, we propose our theoretical model based on the literature review, as shown in Figure 1. Importantly, while presenting the theory, we do not provide arguments regarding *specific* nonlinear relationships because their exact nature is often difficult to theorize a priori [64]. Instead, we theorize the positive/negative influences between the constructs based on a broader logic. However, because there are sufficient reasons to believe that the constructs are related in a nonlinear fashion (given our focus on CBT) and due to the value of engaging in a nonlinear analysis [145], our empirical analyses engage in curvilinear techniques to tease out such nonlinear effects. In this vein, it should be noted that if there is a compelling reason or justification for nonlinearity, *then it should be tested first* [64], which is what we do. Notably, the positive/negative influences we theorize do not mean that they are only linear; positive/negative influences could be linear or nonlinear, even though it has been customary to test them in a linear manner.

Control Imbalance and CB

According to CBT, individuals engage in deviant behavior if they experience a control imbalance, which is a CBR that deviates from 1 [147-149]. This imbalance is often perceived as an opportunity to improve their CBR (either because the CBR<1, which they want to rectify, or because the CBR>1, which they want to leverage). That is, deviant behavior results from an attempt to "escape deficits [CBR<1] and extend surpluses [CBR>1] of control" [146, p. 142].

For example, in the Megan Maier incident, the mother of Megan's friend used social media to improve her CBR over Megan. Megan allegedly spread false rumors about her friend (this mother's daughter). Thus, it can be reasonably inferred that this friend and her mother perceived a control deficit with respect to Megan (i.e., Megan was controlling their lives by spreading false rumors). The mother used social media as a CB revenge platform, which arguably gave her more control due to anonymity.

Control imbalance becomes particularly salient in social media environments. Compared to physical interactions, social media, such as Facebook, can be more easily misappropriated for deviant purposes due to their ubiquity, proliferation, low barrier to entry, and potential for altering or hiding one's true identity [94]. Indeed, there is an emergent consensus that social networks support deviant behavior because they allow this behavior to spread quickly [86]. Interactions via social media also allow individuals to engage with distant acquaintances [97] to whom they feel much less connected to and, consequently, perceive greater control over, which encourages engagement in deviant acts. One participant in a related study [97] commented on the voyeuristic nature of Facebook:

> *Facebook is extremely voyeuristic—there's something great, and at the same time, creepy, about knowing when someone you haven't talked to in 5 years broke up with their boyfriend who you never even met.* [p. 235]

The voyeuristic capabilities of social media sites allow individuals to know intimate details about others, which means that individuals may know more about others' weaknesses and thus perceive a greater ability to harm them due to the information asymmetry. This impacts the control imbalance. Although this creates one form of control imbalance, social media can create control imbalances in the opposite manner. For example, individuals can also learn about the positive experiences of others, which may incite jealousy (due to the perceived differential) and defiance [102], leading to intentions to harm others. For example, secretly viewing one's romantic partner leaving admiring comments on the social media page of an attractive member of the opposite sex may induce feelings of inferiority and jealousy (i.e., control imbalance) and an urge to "get even" with that individual [152]. Indeed, such voyeurism is itself a deviant behavior and a facilitator of other deviant behaviors in which individuals tend to either exploit their control imbalance or improve it through deviant acts [165].

H1. Control imbalance positively influences CB.

Antecedents to Control Imbalance

Deindividuation

One of the considerations in investigating control imbalance is *deindividuation* [52].[ix] Deindividuation has a strong influence on how people perceive the concept of control imbalance. Due to the reduced connection to the social context as a result of deindividuation, individuals feel a decreased possibility of sanctions and constraints [108]. Interacting with computers in general leads individuals to feel "released to behave badly" due to the reduced probability of constraints (e.g., shame) interfering with their deviant action [163]. Likewise, individuals in a virtual mode "are less receptive to sanction threats pertaining to the improper use of IS resources" [29, p. 647].

The sanctions are not limited to formal ones such as legal prosecution. Deindividuation becomes relevant because the perpetrator of CB cannot perceive his or her victims' pain or suffering, thereby leading to lesser feelings of shame or guilt compared to physical interactions [135]. The shroud of cyberspace prevents the perpetrators of CB from observing how the victim immediately reacts to the CB. This emotional segregation eliminates sympathy, resulting in oblivion to the emotional/physical pain one causes [18]. Likewise, individuals are less self-critical in deindividuated contexts [128], which makes them seemingly more in control. For example, research has shown that even when individuals face informal sanctions, such as public shaming, they become averse to committing deviant behaviors [112]. By contrast, in deindividuated contexts of temporal and spatial separation coupled with the possibility of a hidden identity—such as by using pseudonyms or fake identities—the opposite occurs. Individuals then become more confident that they can engage in deviant behaviors (e.g., can control what they do to others) as compared to facing sanctions for them (e.g., how others can control them).

H2. Deindividuation positively affects control imbalance related to CB.

Perceived Accountability

In the context of IS research, scholars have argued that accountability needs to be upheld by the technology, especially in the context of sociotechnical systems [20]. Further research has shown that accountability, if upheld by the technology, reduces intentions of behaving in socially unacceptable ways [21]. We contend that the perceptions of accountability play a salient role in determining, or more specifically, mitigating, control imbalance. It has been established that perceived accountability mitigates deviant behavior [21] while it accentuates positive or pro-social behavior [20]. This is because accountability for negative acts can lead to sanctions and punishment while accountability for positive actions can lead to rewards and benefits. Because positive or pro-social behavior is associated with control balance, it can be argued that perceived accountability results in control balance and thereby *mitigates* control imbalance. That is, perceived accountability has a *negative effect* on control imbalance.

As noted in [155], one of the important effects of perceived accountability is an increase in conservatism, especially when negative behaviors are considered. Studies have indicated that individuals with heightened perceptions of conservatism essentially perceive that although they may have the power to commit certain deviant acts, others can also sanction those acts [81]. A classic example is an organizational/community leader who wields power over others, but this very power also places the leader in the cynosure of others, which increases the possibility of sanctions should he or she commit a deviant act. Accordingly, an individual in a position of power perceives that she or he has the wherewithal to commit a deviant act but is also accountable because of this very wherewithal, hence perceiving his or her power and control as neutralized [40]. This neutralization of power and control restores control balance.

To increase their CBR, individuals often use justificatory rationalizations to reduce their possible sense of guilt and shame for deviant behavior [cf., 134]; however, accountability acts in opposition to this process and balances this increased CBR. Furthermore, in a social media environment that allows the perpetrator to wield control over the victim, accountability neutralizes this control surplus by the perception that any deviant behavior will be sanctioned [104] by being discovered [118]. To conclude, perceived accountability in a social media environment arguably maintains control balance. That is, it prevents control imbalances from occurring, and thus, logically, it negatively influences control imbalance.

H3. Perceived accountability negatively influences control imbalance related to CB.

ITCBPC and Deindividuation

Unless technologies are designed properly—that is, unless they closely approximate the social environment—the reduced connection to the social context creates deindividuation, and individuals may perceive reduced potential for sanctions of deviant behavior [108]. As argued earlier, deindividuation becomes relevant because the perpetrators of CB cannot perceive their victims' pain or suffering, which leads to reduced feelings of shame and guilt compared to those experienced during face-to-face interactions [135]. Shame and guilt serve as emotional controls against deviant acts [6]; thus, the reduction of such shame and guilt should increase control imbalance for negative acts.

ITCBPC allows greater identifiability, social presence, and better evaluation and monitoring, which increases the social connection between the potential cyberbully and the victim and reduces deindividuation [141]. ITCBPC encapsulates IT interfaces that are rich with design attributes, thus allowing for more effective, broader information transfer (e.g., sharing profiles on social media) [59] and increased social presence [11]. This creates greater awareness of others in a virtual context, which is arguably due to increased "cognition and systematic processing" of others [155]. This heightened awareness due to ITCBPC presents a sharp contrast to the deindividuation in other online environments.

In short, ITCBPC refers to the ability of the technological interface to emulate the feeling of human warmth and contact [27, 43]. In fact, technologies that incorporate concurrently high degrees of social presence, identifiability, and evaluation encourage people to ascribe more salience to individuals, which causes less deindividuation [132].

H4. ITCBPC negatively influences deindividuation related to CB.

ITCBPC and Accountability

We contend that technological-supported perceptions of accountability (i.e., ITCBPC) play an important role in mitigating control imbalance. Because ITCBPC reflects a covariance fit between the IT design artifacts, it essentially captures how well they are internally consistent and aligned with each other. Put in another way, ITCBPC captures how well a balance between the four IT design artifacts is achieved.

Such a balance between social media technologies is crucial because it increases accountability [63]. For example, perceptions of social presence should accentuate accountability because it requires social presence [88]. This is because accountability is often associated with pro-social behavior, and any pro-social behavior requires social presence [20]. As noted in [72], individuals who perceive a higher social presence generally feel more accountable for their actions because of the social facilitation effect, in which individuals increasingly perceive that they will be required to interact and justify their actions in a social milieu [154]. Conversely, people who perceive that they are not in a social milieu are not accountable. Accountability is, after all, a social construct. Thus, the perception of being in a social milieu increases accountability. In fact, in the perceived presence of others, individuals tend to process information and make decisions systematically, thus increasing accountability [154].

A high ITCBPC implies that all the IT artifacts mutually reinforce each other. If one or more of the IT artifacts improves accountability and the others reinforce these IT artifacts, then the positive effect on accountability increases. This mutual reinforcement between the IT artifacts is captured by ITCBPC, and so it can be logically argued that high ITCBPC increases accountability. In fact, ITCBPC can be understood as a potential antidote for corrupt behavior precisely because it increases accountability [58]. To summarize, in social media environments, ITCBPC provides advantages by allowing social media designers to develop IT artifacts that promote accountability [20, 21, 155].

H5. ITCBPC positively influences perceived accountability related to CB.

4. DESIGN AND METHODOLOGY

Using the Factorial Survey Method for Graphical IT Design Features

This study is among the most recent to use a new adaptation of the FSM [57, 159] for novel use with graphical IT design artifacts. This IS-specific adaptation was recently established for these artifacts in [155]. Notably, FSM is a unique method that differs from classic experimentation, surveys, and the vignette method. For brevity, we further explain FSM in Appendix C.1.

Factorial Survey Design

The FSM design consisted of the following: 2 (high vs. low identifiability conditions) x 2 (high vs. low monitored conditions) x 2 (high vs. low evaluation expectation conditions) x 2 (known social networks—Facebook vs. unknown social networks—VK) x 3 (high- vs. moderate- vs. low-risk response to CB). These manipulations were delivered through a combination of textual and graphical treatments. The subjects were randomly assigned to a treatment condition by an online survey engine. These manipulations are further documented in Appendix C.2.

Apart from manipulating the exogenous factors related to the IT artifact, we included manipulations related to the riskiness of the CB behaviors. This was necessitated by our use of CBT as the underlying theoretical framework. CBT, which originated in criminology literature, has been successfully applied to other behaviors in other fields; yet, many forms of CB are noncriminal. Thus, we tested high-, moderate-, and low-risk responses to CB to ascertain whether the inherent riskiness of the behaviors engaged in by the character in the vignette might alter the veracity of our model.

Procedures

For brevity, our procedures, along with example mockups, are detailed in Appendix B.

Data Collection via Amazon's Mechanical Turk

Prior to the final data collection, we conducted three pilot studies (documented in Appendix C.3). For the final data collection, we recruited participants by means of Amazon's Mechanical Turk™ (MTurk).[x] The corresponding institutional review board approved the study, and all participants gave their informed consent to participate. The incentive for participating in this study was US$3, which is on the higher end of compensation for MTurk. We followed classic procedures for preventing common-method bias (CMB) a priori, such as using established scales, randomizing the appearance of questions, and using different scaling for some measures [103]. Moreover, we gathered a marker variable (resentment) so that we could use the marker-variable technique to test for CMB ex-post facto [103, 114]. We also followed some of the latest guidelines for preventing CMB and improving data quality with the MTurk online panel studies [55, 76, 84, 95]. Subject details are summarized in the endnotes.[xi]

Measures

All our measures were established in the literature. Several were slightly changed to be properly contextualized to CB. Several experts reviewed them, after which they were further refined through three rounds of pilot testing. Most constructs were measured by multiple indicators using seven-point Likert-type scales (see Appendix A); however, control imbalance was measured by the ratio of the control subjects exerted to the control to which they were subjected.

ANALYSES

We first determined the effectiveness of the manipulations, and all manipulation checks were confirmed, as detailed in Appendix C.4. We used the covariance-based SEM (CB-SEM) tool, STATA (version STATA/SE 14.2), for our analysis. Assessing factorial validity with CB-SEM is different from the approach commonly used with components-based methods, such as partial least squares regression [46, 77]. Multiple comment tests confirmed convergent and discriminant validities.[xii] The measurement model statistics are in Appendix C, Table C.2. We also confirmed CMB was not a likely issue.[xiii]

Also, riskiness was added in as one of the control variables and did not display significant results.[xiv] This establishes the veracity of our model and the fact that it is not prone to perceptions of riskiness. It also shows that in a cyberbullying scenario, perceptions of risk are not important. Especially if one is deindividuated (as in cyberspace), then perceptions of repercussions are less salient; consequently, riskiness often becomes irrelevant.

Establishing IT CB Prevention Capability

As noted, fit as covariance, which is conceptualized as an internal consistency among the underlying constructs, reflects our construct of ITCBPC. A covariance fit requires that all components must be present for the overall fit to occur. Empirically, this fit is assessed through a factor analysis, which is used to verify whether all the constructs covary. This was fully confirmed through statistical tests.[xv]

6. RESULTS AND DISCUSSION

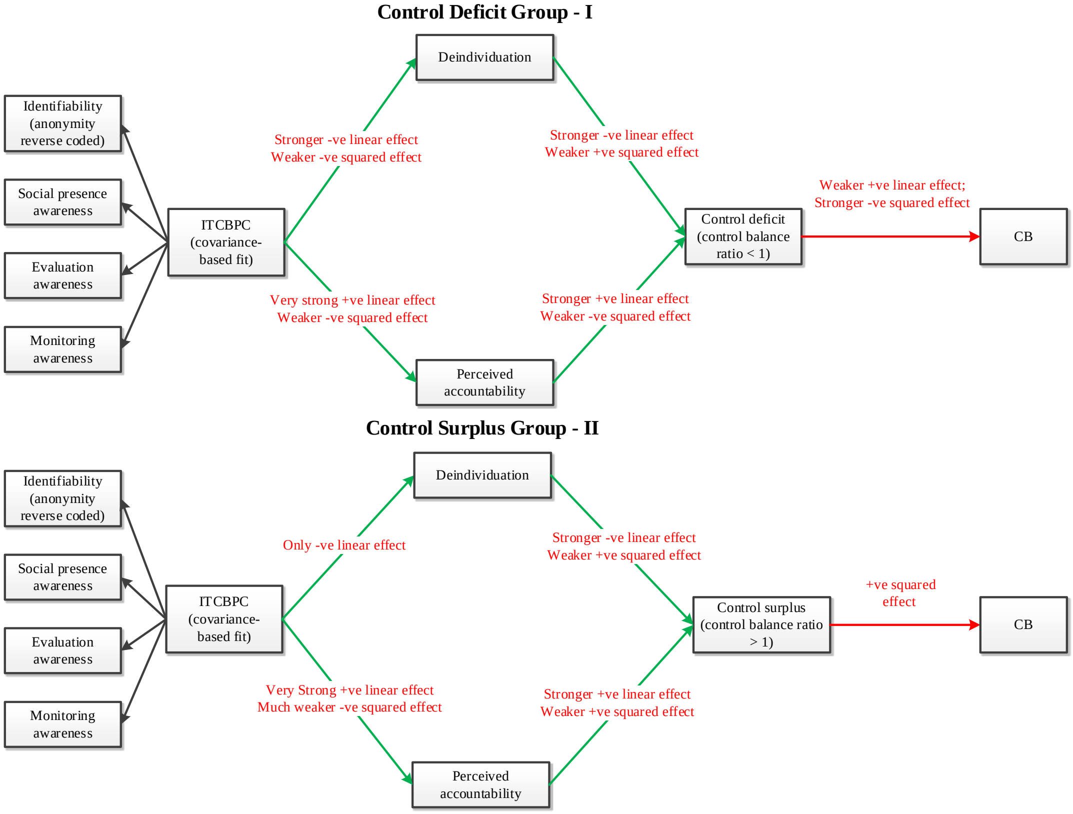
Overview of Results

We tested our model with total of 507 adults using an innovative application of the factorial survey method and using social media artifacts. Specifically, to tease out the intricacies of CB, we tested the model in the following subsamples: (1) individuals who perceive a control deficit (CBR<1) (n = 193); (2) individuals who perceive a control surplus (CBR>1) (n = 186); and (3) where CBR=1, no effect on CB intention by CBR. Therefore, this subsample was excluded from future results and discussion (n = 128).

This testing according to separate subgroups was necessary because there are various ways in which control deficit and control surplus influence engagement in CB. Furthermore, the notion of control imbalance is different for the different subgroups of control deficit (CBR<1) and control surplus (CBR>1). Again, $\mathbf{CBR} = \frac{\textbf{perceived control exerted}}{\textbf{perceived control experienced}}$. Thus, CBR<1 (or control deficit) implies that the individuals feel that they exert lesser control over others than the others do over them. CBR>1 (or control surplus) implies that individuals feel that they exert greater control over others than others do over them. Although these categories of people both engage in deviant behavior, they do so in different ways; therefore, lumping both categories together would not provide adequate insight into the very complex phenomenon of CB, nor would it allow us to explore the nonlinear relationship between CB intention and control imbalances. Figure 2 shows the varying findings across the subgroups for our model, and Table 1 specifies the results for our model tests.

The results show that most hypotheses are supported for both the surplus (CBR>1) and deficit (CBR<1) groups if we focus only on linear effects. However, focusing on nonlinear effects, although

Figure 2. Model Testing across the Two Different Subgroups: Control Deficit and Control Surplus



Control Deficit Group - I

Deindividuation
Identifiability (anonymity reverse coded)
Social presence awareness
Evaluation awareness
Monitoring awareness
ITCBPC (covariance-based fit)
Stronger -ve linear effect
Weaker -ve squared effect
Stronger -ve linear effect
Weaker +ve squared effect
Control deficit (control balance ratio < 1)
Weaker +ve linear effect;
Stronger -ve squared effect
CB
Very strong +ve linear effect
Weaker -ve squared effect
Stronger +ve linear effect
Weaker -ve squared effect
Perceived accountability

Control Surplus Group - II

Deindividuation
Identifiability (anonymity reverse coded)
Social presence awareness
Evaluation awareness
Monitoring awareness
ITCBPC (covariance-based fit)
Only -ve linear effect
Stronger -ve linear effect
Weaker +ve squared effect
Control surplus (control balance ratio > 1)
+ve squared effect
CB
Very Strong +ve linear effect
Much weaker -ve squared effect
Stronger +ve linear effect
Weaker +ve squared effect
Perceived accountability

largely conforming to the hypotheses, there are interesting variations. Per Table 1, we find the following outcomes for the two types of control imbalances: (a) **CBR<1 (control deficit, where perceived control exerted is less than perceived control experienced)**: Individuals who experience a control deficit have an increased motivation to cyberbully to obtain a balance (a positive linear relationship). However, as the control imbalance diminishes in the process (and the CBR approaches 1), the cyberbully will have diminishing motivations to cyberbully, as indicated by the negative squared effect. (b) **CBR>1 (control surplus, where perceived control exerted is more than perceived control experienced):** The finding is reversed for control imbalances above 1. Initially, individuals are less inclined to bully, as represented by the nonsignificant linear effect. But if they do, it has an enhancing effect on itself that overcomes the initial inhibition and increases the likelihood of CB (represented by the positive squared effect).

Implications and Contributions of Our Findings

As noted, the linear effects were generally consistent with what we had hypothesized, but the nonlinear effects were more interesting and revealed finer nuances in the relationships between our

Table 1. Model Results[xvi]

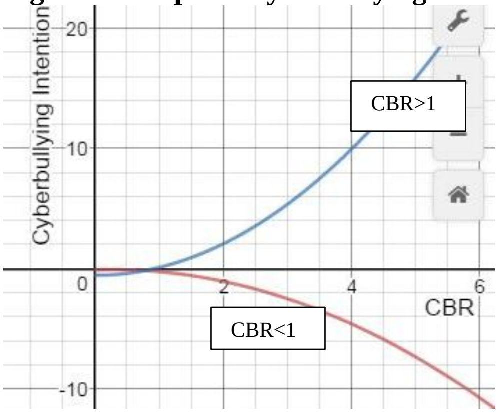
CBR < 1					
Relationship	***b***	***SE***	***t***	***p***	***Significant?***
ITCBPC → Deindividuation	-.252	.030	8.35	.000	Yes
ITCBPC → Perceived Accountability	.551	.021	25.12	.000	Yes
ITCBPC^2 → Deindividuation	-.159	.030	-2,97	.003	Yes
ITCBPC^2 → Perceived Accountability	-.115	.027	-2.48	.013	Yes
Deindividuation → Control Balance	-.231	.041	2.74	.006	Yes
Perceived Accountability → Control Balance	.371	.051	3.34	.001	Yes
Deindividuation^2 → Control Balance	.135	.039	2.90	.004	Yes
Perceived Accountability^2 → Control Balance	-.177	.043	-2.79	.005	Yes
Control imbalance → Intention	.175	.078	2.10	.018	Yes
Control imbalance^2 → Intention	-.323	.013	-3.00	.002	Yes
Controls					
Computer proficiency	.063	.028	2.28	.022	Yes
Computer experience	-.166	.036	-4.69	.000	Yes
Low self-control	.198	.038	5.34	.000	Yes
Control imbalance R^2 = .255; deindividuation R^2 = .269; accountability R^2 = .324; $X^2_{(509)}$ = 13411.44; CFI = .971; SRMR = .074	Intention R^2 = .229; Intention $R^2_{\text{with controls}}$ = .252; RMSEA = .065; TLI = .943; CD = 1.000				
CBR > 1					
Relationship	***b***	***SE***	***t***	***p***	***Significant?***
ITCBPC → Deindividuation	-.224	.101	-2.21	.027	Yes
ITCBPC → Perceived Accountability	.706	.053	17.12	.000	Yes
ITCBPC ^{2} → Deindividuation	-.012	.106	-0.11	.926	No
ITCBPC ^{2} → Perceived Accountability	-.138	.040	-2.40	.016	Yes
Deindividuation → Control Balance	-.222	.094	2.22	.028	Yes
Perceived Accountability → Control Balance	.315	.130	2.10	.034	Yes
Deindividuation^2 → Control Balance	.121	.093	1.23	.234	No
Perceived Accountability^2 → Control Balance	.211	.132	2.08	.038	Yes
Control imbalance → Intention	-.231	.162	-1.43	.152	No
Control imbalance^2 → Intention	.653	.202	5.89	.000	Yes
Controls: Computer experience	-.219	.100	2.20	.027	
Control imbalance R^2 = .211; deindividuation R^2 = .150; Accountability R^2 = .497; $X^2_{(509)}$ = 2902.890; CFI = .941; SRMR = .077	Intention R^2 = .214; Intention $R^2_{\text{with controls}}$ = .218 RMSEA = .080; TLI = .921; CD = 1.000				

constructs of interest. In almost all cases, the linear effects were stronger, but the nonlinear (squared) effects were significant as well.

Control Imbalance (Represented by CBR) and CB Intention

It is clear from our investigation that CB arises in situations of control imbalance between the perpetrator and the victim. This finding is quite consistent with the existing views that social media are breeding grounds for control imbalance.[xvii] However, what is particularly interesting is the different ways in which control imbalance affects CB intentions for the control-surplus group and the control-deficit group. For the control-deficit group (CBR<1), control imbalance has a negative squared curvilinear effect on CB intentions while revealing a positive main effect. In contrast, for the control-surplus group (CBR>1), control imbalance has a nonsignificant linear effect but displays a strongly positive curvilinear effect on CB intentions. See Figure 3.

Figure 3. Graph of Cyberbullying Intention vs CBR, for CBR <1 and CBR>1



True to the tenets of curvilinear regression, the existence of a positive coefficient for a multiplicative term implies that an increase in one increases the impact of another, whereas a negative coefficient for a multiplicative term implies that an increase in one decreases the impact of another [145]. Therefore, for the control-deficit group, it can be inferred that the coexistence of a positive linear effect and a negative squared effect of control imbalance on CB intention implies that control imbalance negatively moderates its own positive influence on CB intentions. Conversely, for the control-surplus group, it can be inferred that control imbalance only catalyzes its own relationship with CB intentions. That is, the role of control imbalance in the control-deficit group is *self-impeding*, whereas the role of control imbalance in the control-surplus group is *purely self-cascading*.

The question is: Why is this the case? This could be because of the ulterior motives of CB. It seems that individuals who perceive themselves to be vulnerable (i.e., CBR<1) intend to engage in more CB only when they are nearly balanced. Whereas individuals who perceive themselves to be in relatively powerful positions (CBR>1) have less of an inclination to cyberbully when they are nearly balanced and have greatly increased intentions as their CBR becomes less balanced. What this implies is that CB is more of a *retaliation*—perhaps to pressures (control) inside or outside of cyberspace—than an action. In fact, the Megan Meier incident supports this finding; the mother of Megan’s friend thought that Megan was controlling their lives by spreading false rumors about her daughter, and she used CB as a revenge mechanism to compensate for a perceived control deficit.

In CBT terms, CB is both a mechanism to escape control deficit and to extend a control surplus, but only for those who are significantly imbalanced (both reasons for deviant actions, per CBT). We can conjecture several reasons as to why control deficit assumes salience in CB; one reason is that it is easier to wield power in cyberspace, which either stimulates or supports this retaliation. Because there is a greater potential for control imbalance in cyberspace it is easy to feel vulnerable, which encourages retaliation using the same cyberspace mechanisms. For example, social media provide a breeding ground for narcissism, where the focus is making oneself popular and attractive and thus inherently more powerful [153]. Efforts to extend surpluses of control by some may stimulate retaliatory actions by people who may perceive themselves as not so attractive and thus possessing less control. In other situations, the ending of a social media relationship is often not mutual; one can be "unfriended" without immediately realizing it. For example, relationship dissolution via social media (e.g., unfriending or blocking) is a key example of control imbalance that gives an individual unilaterally more control over the relationship (control surplus). In fact, even after relationships are terminated, exposure to social media pages of an ex-partner or friend hinders the healing process and encourages jealousy and ex-partner stalking [23].

In reaction to the control surpluses of others and their own control deficits, victims resort to deviant outcomes fueled by jealousy or other negative emotions, creating further imbalance and more deviant outcomes [13]. This shows that perceived or real vulnerability in cyberspace can lead to revenge behaviors and other malicious usages of social media. Tellingly, this retaliation through cyberspace may be due to a lack of control felt in the physical world as well. For example, this retaliation could be against someone who is trying to exercise power in cyberspace (e.g., boasting of their achievements, arousing jealousy) or against someone who has threatened the perpetrator in the physical world.

In short, because of the power afforded by cyberspace, individuals often choose Internet technologies as a means of retaliation [119]; thus, it is important to design technology that negates this power imbalance. If technologies are not designed with proper controls in mind, social media users often put themselves at risk [37], which ultimately breeds retaliation. This observation leads us to interpreting the next set of relationships—between deindividuation, accountability, and CBR and between ITCBPC, deindividuation, and accountability.

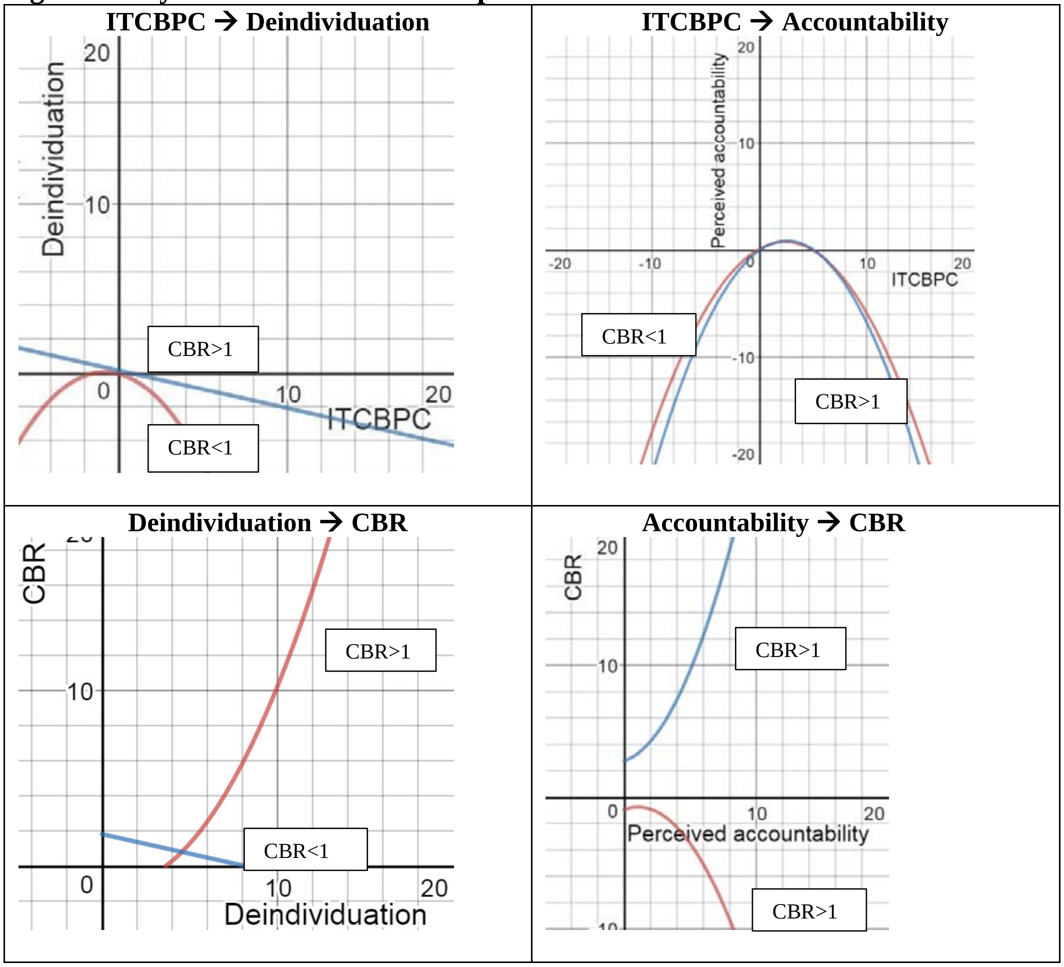
Antecedents to CBR: Deindividuation and Accountability

Deindividuation influenced CBR in a negative manner for both CBR<1 and CBR>1. The linear negative effect was the most prominent, but there was also a significant positive nonlinear effect when CBR<1. That is why the relationship between deindividuation and CBR assumes a U-shaped relationship when CBR<1 and a simple nonlinear relationship when CBR>1.

We hypothesized that deindividuation increases control imbalance. In the case of CBR<1, this would imply that as individuals become more deindividuated, CBR would move further away from 1. This was reflected in our results; however, there was also a significant positive squared influence of deindividuation on CBR (when CBR<1). So at some point, the effects of deindividuation create a ceiling effect when further deindividuation does not decrease the control balance ratio. It has been argued that excessive deindividuation creates the lack of a reference point for judgment, especially "comparative appraisal" [15]; the individual is so deindividuated that she or he becomes totally oblivious to the outside world and desensitized to outsiders. A desensitized person cannot possibly evaluate the CBR, especially whether it is imbalanced. In sum, extreme deindividuation leads to ambivalence regarding the CBR with the effect it has moving CBR closer to 1, thus achieving control balance. See Figure 4.

The relationship between deindividuation and CBR when CBR>1 is contrary to our predictions. The results show that in this case, as deindividuation increases, CBR decreases (i.e., control imbalance decreases because it is moving closer to 1). This is in contrast to our theory that deindividuation would positively affect control imbalance. It seems for CBR>1, individuals approach more control balance with increasing deindividuation. This surprising result might be because individuals with CBR>1 are usually powerful individuals to start with. Knowing that they often can be held accountable due to their position of power, they may guard against deindividuation and its possible effects. Thus, the results in this case could be due to an inherent self-regulatory mechanism that kicks in for people who perceive themselves to be powerful. Restoring the control balance for CBR>1 implies that it decreases and moves closer to 1, which is what our results support.

Figure 4. Key Curvilinear Relationships Found in Our Data



ITCBPC → Deindividuation

ITCBPC → Accountability

Deindividuation → CBR

Accountability → CBR

The effect of perceived accountability on CBR is also interesting. First, when CBR<1, there is both a linear positive influence and a squared negative influence. Second, when CBR>1, there are both linear and squared positive influences. This implies that for CBR<1, as accountability increases, CBR increases and draws closer to 1. That is, more accountability leads to control balance. However, the accountability drastically increasing has a self-impeding effect and, after a threshold point, tends to negatively affect CBR, resulting in CBR moving away from 1 (i.e., decreasing). Arguably, too much accountability puts one in a vulnerable position, with the effect that the individual starts feeling less in control. That is, the pressures of increased accountability make the person increasingly seem to be the victim of social pressure; thus, CBR decreases. This especially happens because the individuals who perceive CBR<1 feel that they are in a relatively disadvantaged position related to power and control to start with. Moreover, per CBT, these individuals are prone to retaliatory deviant behavior. Thus, although accountability keeps them in check for a while, increasing accountability forces them to return to the vicious phase of being perceived as a victim. Coupled with their initial social status of less power and control, too much accountability makes them even more vulnerable to the outside world.

For CBR>1, the results show that increasing accountability has a self-cascading effect. Thus, CBR increases drastically as accountability increases. Because CBR is already greater than 1, this means that it moves further away from the control balance (CBR=1). The explanation is that increasing accountability is often associated with increasing power structure. If an individual, for example, receives a promotion, she or he feels increasingly accountable. Thus, the causes that increase accountability also elevate the individual to a higher power structure, which causes greater CBR.

ITCBPC and its Effects: Deindividuation and Accountability

The relationship between ITCBPC and deindividuation is negative, whether CBR<1 or CBR>1. For CBR<1, the negative effect is both linear and squared. This implies that as ITCBPC increases, deindividuation decreases rapidly. Conversely, for CBR>1, ITCBPC has only a linear negative influence on deindividuation. This finding has special salience because it shows that IT artifacts can be designed to reduce control imbalance, thereby leading to more conformist and less deviant behaviors, which includes a reduction in CB. Our finding contrasts existing observations that technology often contributes to CB.[xviii]

One of the problems associated with technology is the “structural ambiguity” afforded by ICTs, which tends to increase complexity and force individuals to misunderstand communications and interpret them in a hostile manner [119]. IT-mediated environments provide a way to both control others and feel controlled by others [140]; thus, they support ways to retaliate for offline control imbalances [119], which indicates that the social media environment could be a haven for control imbalance. In contrast to such findings, our study shows that it is not technology, but rather *ill-designed* technology that can be problematic. Our study shows that if social media are designed with the appropriate features (e.g., identifiability, monitoring awareness, social presence awareness, and evaluation awareness), it creates an overall preventive mechanism reflected by the ITCBPC.

One explanation for why deindividuation decreases more rapidly for the CBR< group 1 is that this group is more susceptible to retaliatory deviance. Feelings of vulnerability (characterized by CBR<1) create feelings of isolation, and feelings of isolation often lead to deindividuation. Conversely, for CBR>1, feelings of deindividuation decrease less rapidly because this group feels they are in a position of power. Because power is enjoyed only in a relationship, the mental perks of being in a powerful position only come from being less deindividuated. Recall that deindividuation implies that one loses sense of the social surroundings, and this would likely affect the satisfaction associated with being in a position of power. Therefore, for CBR>1, deindividuation decreases less rapidly.

Finally, there is the relationship between ITCBPC and perceived accountability. The results are consistent for CBR<1 and CBR>1. There is an extremely strong positive influence of ITCBPC on accountability, but there is a significant negative squared influence as well. This shows that when IT design artifacts co-align, it creates a powerful and positive effect on accountability. Because accountability generally has a detrimental effect on control imbalance, IT features that are designed and work in tandem to prevent CB have a positive preventive effect.

What is somewhat surprising is that ITCBPC has a negative squared influence on accountability. This implies that at some level, excessive increases in ITCBPC create an impeding effect on accountability. This finding can be understood in terms of the detrimental effects of excessive alignment of information technologies (i.e., high ITCBPC). If ITCBPC exceeds a certain level, then it implies that the IT design features are excessively aligned with each other. Whereas alignment has often been a valued concept in IS research and has been regarded as an enabler of success, recent studies on complexity theory tend to differ on this point [91, 92].[xix] In our case, therefore, a slight degree of misalignment between IT design artifacts might be useful to promote accountability.

To conclude, because both deindividuation and accountability are key factors in CB, our study shows that if social media are designed with the appropriate features (e.g., identifiability, monitoring awareness, social presence awareness, and evaluation awareness), it creates an overall CB-preventing mechanism reflected by the ITCBPC. Thus, these four IT design features should be the primary focus of social media design and implementation.

Post-hoc Analysis

Because there were interesting nonlinear aspects in our main model, we attempted to tease out further insights using a post-hoc analysis. Notably, this analysis was driven by empirical results—not theory—especially in the perceived variety of results for the relationships for both the CBR<1 group and the CBR>1 group. The post-hoc analysis specifically considered whether the constructs of deindividuation and perceived accountability each moderated the effects of the other one on CBR. We summarize these analyses in Appendix C.5.

Our main aim for this post-hoc analysis was to provide foundations for future research. As shown in Table C.3, it is notable that both the moderations on the curvilinear relationships are significant. This indicates that not only are there serious and often counterintuitive nonlinear relationships in our main model, but also important nonlinear moderations to those nonlinear relationships. What this ultimately indicates is that the phenomenon of CB in social media is highly complex, as can be inferred from the figure. Understandably, a detailed examination of these relationships is outside the scope of the paper because our main focus was to highlight the role of technology in CB. However, we do acknowledge that a more nuanced view of these relationships is needed, and consequently, we call for future research to take these investigations further.

Contributions to Research

Three important contributions are made by our study. We are among the first to introduce CBT—particularly using the constructs of control surplus and control deficit—into the context of CB and integrate CBT with features of IT design artifacts. Both control-surplus and control-deficit groups are destabilizing factors that are related to increased CB intentions. CBT is a criminological theory that has not been applied to CB, but we argue that it applies especially well in this context.

As explained by CBT, control imbalances increase one’s intentions to engage in CB, as supported in this study. Thus, future research can continue to develop and expound upon this insight and explore how different design features or interventions can alter the perceived power of would-be bullies or stalkers. Having validated the notion that victims have less perceived power than their attackers in online social networks, we also show that abundance or lack of power are important factors. Our findings strongly indicate that CB is *mainly a phenomenon of revenge* in which the victim retaliates to avoid feeling powerless.

From an IS standpoint, social media design features can be implemented to *influence* control imbalance and thus CB. This is particularly important because we emphasize IT artifacts that have not been considered previously: monitoring awareness, evaluation awareness, social presence, and an expanded conceptualization of identifiability. Research on CB has been largely atheoretical and lacking in connection to the interface of the platforms being researched. These interface design constructs are particularly useful in practice because as demonstrated in the current research, they can create accountability that helps reduce CBR imbalances. Hence, we demonstrate how the IT design features can be leveraged to decrease CB, an important finding that should be taken up in future research.

Finally, we are among the first to leverage the FSM using design artifacts following the novel approach developed in [155]. This method is particularly effective because it is neither experiment- nor survey-based, and it allows for the full orthogonality of the factors while preventing multicollinearity. We were thus able to test factorial design and text combinations that would have been virtually impossible to test using experimentation or surveys.

Contributions and Implications for Practice

From a practical standpoint, the value of this study lies in unearthing what could possibly prevent CB, and whether it is practically implementable or not is something that future researchers and practitioners need to decide. Our objective is to raise awareness of this problem and propose pathways for further consideration. Adopting, adapting, or even customizing the pathways would be in the domain of future research and practice. We are hopeful that as technology advances and human beings become more aware of the possible dangers lurking inside social media, they can accept the loss of some conveniences on their social media, and we will see less CB proliferation.

One core issue to consider is that CB is a serious phenomenon that often has disastrous consequences. As researchers and practitioners, if we can contribute to decreasing it, even if by a small amount, we would be serving society significantly. Even if all our technological and policy implications are not doable for all social media contexts, at least some of them are, and implementing those would still be helpful in reducing the spread of CB. Certainly, more can be done from practice (and research) to promote prosocial behaviors on social media [67].

Limitations and Future Research

The use of the FSM yielded several benefits in that we could effectively consider a sophisticated research design of IT artifact manipulations that would have been exceedingly difficult, if not impossible, to consider with a traditional experiment; however, the most significant drawback to this method is that we did not observe people committing CB. Such observational data are particularly difficult to find for clear legal and ethical reasons; however, actual observations involving CB would be especially useful for further model testing.

However, this study also suffers from the limitation of having collected the data in a short period of time. Thus, it would be useful to examine CBT in a longitudinal setting. This could be done both to examine how IT artifacts work to foster and impede CB over time and to examine whether there are control-balance shifts over time as CB incidents unfold.

Another limitation of this study is that our participants were primarily from the United States, which limits the generalizability of the results. The advantage of this approach was that it reduced unnecessary variability within our sample. However, there may be substantial variations in laws and cultural norms concerning CBT, as well as CB practices, across different national cultures (e.g., China, India, Russia, Egypt) or across an individual level of culture (e.g., collectivism, individualism). Such differences have been demonstrated in many IS studies. Hence, cross-cultural research in this area may be highly important.

Another interesting finding that could inspire more research is that riskiness, as a control variable, did not have any effect on cyberbullying intention. Although this supports the stability of our model, it is also important to investigate whether it was an artifact of our empirical approach. Thus, the relation between riskiness and cyberbullying intention should be investigated further. It also needs to be investigated whether the lack of effect of riskiness is because our study deals with cyberbullying. Often, in cyberspace, perceptions of riskiness can erode due to deindividuation. Therefore, a comparative study between online and offline bullying behaviors could be used to look deeper into this phenomenon.

Finally, although our representation of social anonymity was more complex than typical binary representations of anonymity, it still is not as rich as in other IS studies [78, 98]. These included the added anonymity factors of lack of proximity, knowledge of others, and confidence in the system to function. These are additional anonymity IT artifact factors that should be investigated in this line of research.

Another important direction of future work would be an analysis of the individual differences of cyberbully victims.[xx] It is clear that time spent on social media can also be a crucial factor in determining the victim's response. Thus, if someone who has spent more time on social media perceives an act of CB, then his or her negative feeling or reaction would certainly be more intense than someone who has spent less time on social media and who is in a comparatively better mood. In such situations of emotional duress, a seemingly innocuous joke by the sender could be perceived by the receiver as an act of CB when it was not intended to be. Thus, an investigation of individual differences, and especially their interplay with power and CBT in a sociotechnical environment, is called for.

Finally, the nonlinear moderation that our post-hoc analyses revealed should be investigated further because it has the potential to illuminate richer and more complex insights into the complex phenomenon of CB in social media.

REFERENCES

1. Aboujaoude, E; Savage, MW; Starcevic, V; and Salame, WO. Cyberbullying: Review of an old problem gone viral. *Journal of Adolescent Health*, 57, 1 (2015), 10-18.
2. Adler, A; Nash, JC; and Noël, S. Evaluating and implementing a collaborative office document system. *Interacting with Computers*, 18, 4 (2006), 665-682.
3. Anderson, P. Perspective: Complexity theory and organization science. *Organization Science,* 10, 3 (1999), 216-232.
4. Anstead, N and O'Loughlin, B. Social media analysis and public opinion: The 2010 UK general election. *Journal of Computer-Mediated Communication*, 20, 2 (2015), 204-220.
5. Arntfield, M. Toward a cybervictimology: Cyberbullying, routine activities theory, and the anti-

sociality of social media. *Canadian Journal of Communication*, 40, 3 (2015), 371-388.

6. Ausubel, DP. Relationships between shame and guilt in the socializing process. *Psychological Review*, 62, 5 (1955), 378-390.
7. Banjanin, N; Banjanin, N; Dimitrijevic, I; and Pantic, I. Relationship between Internet use and depression: Focus on physiological mood oscillations, social networking and online addictive behavior. *Computers in Human Behavior*, 43, February (2015), 308-312.
8. Bauman, S and Bellmore, A. New directions in cyberbullying research. *Journal of School Violence*, 14, 1 (2015), 1-10.
9. Bauman, S; Cross, D; and Walker, J. *Principles of cyberbullying research: definitions, measures, and methodology*: Routledge, 2013.
10. Bauman, S and Yoon, J. This issue: Theories of bullying and cyberbullying. *Theory Into Practice*, 53, 4 (2014), 253-256.
11. Beck, R; Pahlke, I; and Seebach, C. Knowledge exchange and symbolic action in social media-enabled electronic networks of practice: A multilevel perspective on knowledge seekers and contributors. *MIS Quarterly*, 38, 4 (2014), 1245-1270.
12. Beltrán-Martín, I; Roca-Puig, V; Escrig-Tena, A; and Bou-Llusar, JC. Human resource flexibility as a mediating variable between high performance work systems and performance. *Journal of Management*, 34, 5 (2008), 1009-1044.
13. Bevan, JL; Pfyl, J; and Barclay, B. Negative emotional and cognitive responses to being unfriended on Facebook: An exploratory study. *Computers in Human Behavior*, 28, 4 (2012), 1458-1464.
14. Bharadwaj, AS. A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly*, 24, 1 (2000), 169-196.
15. Brewer, MB and Pickett, CL. The social self and group identification. *The Social Self: Cognitive, Interpersonal and Intergroup Perspectives*, 4, (2014), 255.
16. Calvete, E; Orue, I; Estévez, A; Villardón, L; and Padilla, P. Cyberbullying in adolescents: Modalities and aggressors' profile. *Computers in Human Behavior*, 26, 5 (2010), 1128-1135.
17. Campbell, MA. How research findings can inform legislation and school policy on cyberbullying. In S. Bauman, D. Cross, and J. Walker (eds.), *Principles of Cyberbullying Research, Definitions, Measures, and Methodology*. New York: Routledge, 2013, pp. 290-303.
18. Cassidy, W; Faucher, C; and Jackson, M. Cyberbullying among youth: A comprehensive review of current international research and its implications and application to policy and practice. *School Psychology International*, 34, 6 (2013), 575-612.
19. Chatterjee, S; Moody, G; Lowry, PB; Chakraborty, S; and Hardin, A. Strategic relevance of organizational virtues enabled by information technology in organizational innovation. *Journal of Management Information Systems*, 32, 3 (2015), 158-196.
20. Chatterjee, S; Sarker, S; and Fuller, M. A deontological approach to designing ethical collaboration. *Journal of the Association for Information Systems*, 10, 3 (2009), 138-169.
21. Chatterjee, S; Sarker, S; and Valacich, JS. The behavioral roots of IS security: Exploring key factors of unethical IT use. *Journal of Management Information Systems*, 31, 4 (2015), 49-87.
22. Christopherson, KM. The positive and negative implications of anonymity in Internet social interactions:"On the Internet, nobody knows you're a dog". *Computers in Human Behavior*, 23, 6 (2007), 3038-3056.
23. Clayton, RB; Nagurney, A; and Smith, JR. Cheating, breakup, and divorce: Is Facebook use to blame? *Cyberpsychology, Behavior, and Social Networking*, 16, 10 (2013), 717-720.
24. Cross, D; Bauman, S; and Walker, J. Summary and conclusions. In D. Cross, S. Bauman, and J. Walker (eds.), *Principles of Cyberbullying Research: Definitions, Measures, and Methodology*. New York: Routledge, 2013, pp. 337-353.
25. Cua, KO; McKone-Sweet, KE; and Schroeder, RG. Improving performance through an integrated manufacturing program. *The Quality Management Journal*, 13, 3 (2006), 45-60.
26. Curry, TR. Integrating motivating and constraining forces in deviance causation: A test of causal chain hypotheses in control balance theory. *Deviant Behavior*, 26, 6 (2005), 571-599.

27. Cyr, D; Hassanein, K; Head, M; and Ivanov, A. The role of social presence in establishing loyalty in e-service environments. *Interacting with Computers*, 19, 1 (2007), 43-56.
28. Cyr, D; Head, M; Larios, H; and Pan, B. Exploring human images in website design: a multi-method approach. *MIS Quarterly*, 33, 3 (2009), 539-566.
29. D'Arcy, J and Herath, T. A review and analysis of deterrence theory in the IS security literature: making sense of the disparate findings. *European Journal of Information Systems*, 20, 6 (2011), 643-658.
30. D'Cruz, P and Noronha, E. The interface between technology and customer cyberbullying: Evidence from India. *Information and Organization*, 24, 3 (2014), 176-193.
31. D’Arcy, J and Hovav, A. Does one size fit all? Examining the differential effects of IS security countermeasures. *Journal of Business Ethics*, 89, 1 (2009), 59-71.
32. Davison, CB and Stein, CH. The dangers of cyberbullying. *North American Journal of Psychology*, 16, 3 (2014), 595-606.
33. Dehue, F. Cyberbullying research: New perspectives and alternative methodologies. Introduction to the special issue. *Journal of Community & Applied Social Psychology*, 23, 1 (2013), 1-6.
34. DeLisi, M and Hochstetler, A. An exploratory assessment of Tittle's control balance theory: Results from the National Youth Survey. *The Justice Professional*, 15, 3 (2002), 261-272.
35. Dinakar, K; Jones, B; Havasi, C; Lieberman, H; and Picard, R. Common sense reasoning for detection, prevention, and mitigation of cyberbullying. *ACM Transactions on Interactive Intelligent Systems*, 2, 3 (2012), article 18.
36. Doane, AN; Pearson, MR; and Kelley, ML. Predictors of cyberbullying perpetration among college students: An application of the theory of reasoned action. *Computers in Human Behavior*, 36, (2014), 154-162.
37. Ellison, NB; Steinfield, C; and Lampe, C. The benefits of Facebook “friends:” Social capital and college students’ use of online social network sites. *Journal of Computer-Mediated Communication*, 12, 4 (2007), 1143-1168.
38. Espelage, DL; Rao, MA; and Craven, RG. Theories of cyberbullying. In S. Bauman (ed.), *Principles of Cyberbullying Research: Definitions, Measures, and Methodology*. New York: Routledge, 2013, pp. 78-97.
39. Espinoza, G and Juvonen, J. Methods used in cyberbullying research. In S. Bauman, D. Cross, and J. Walker (eds.), *Principles of Cyberbullying Research, Definitions, Measures, and Methodology*. New York: Routledge, 2013, pp. 142-154.
40. Fiske, ST. Controlling other people: The impact of power on stereotyping. *American Psychologist*, 48, 6 (1993), 621-628.
41. Fox, KA; Nobles, MR; and Fisher, BS. A multi-theoretical framework to assess gendered stalking victimization: The utility of self-control, social learning, and control balance theories. *Justice Quarterly*, (2014), 1-29.
42. Friedman, B; Kahn Jr, PH; Borning, A; and Huldtgren, A. Value sensitive design and information systems. In N. Doorn, D. Schuurbiers, I. Van de Poel, and M. Gorman (eds.), *Early Engagement and New Technologies: Opening up the Laboratory*: Springer, 2013, pp. 55-95.
43. Gefen, D and Straub, DW. Consumer trust in B2C e-Commerce and the importance of social presence: experiments in e-Products and e-Services. *Omega*, 32, 6 (2004), 407-424.
44. Gosling, SD and Mason, W. Internet research in psychology. *Annual Review of Psychology*, 66, (2015), 877-902.
45. Grover, V. The information systems field: Making a case for maturity and contribution. *Journal of the Association for Information Systems*, 13, 4 (2012), 254-272.
46. Hair Jr., JF; Black, WC; Babin, BJ; and Anderson, RE. *Multivariate Data Analysis*, 7th ed. New York, NY: Prentice Hall, 2006.
47. Hall, AT; Frink, DD; and Buckley, MR. An accountability account: A review and synthesis of the theoretical and empirical research on felt accountability. *Journal of Organizational Behavior*, 38, 2 (2015), 204-224.

48. Halpern, D and Gibbs, J. Social media as a catalyst for online deliberation? Exploring the affordances of Facebook and YouTube for political expression. *Computers in Human Behavior*, 29, 3 (2013), 1159-1168.
49. Harrendorf, S. How Can Criminology Contribute to an Explanation of International Crimes? *Journal of International Criminal Justice*, 12, 2 (2014), 231-252.
50. Hickman, MJ; Piquero, AR; Lawton, BA; and Greene, JR. Applying Tittle's control balance theory to police deviance. *Policing*, 24, 4 (2001), 497-520.
51. Hinduja, S and Patchin, JW. Cyberbullying: An exploratory analysis of factors related to offending and victimization. *Deviant Behavior*, 29, 2 (2008), 129-156.
52. Hinduja, S and Patchin, JW. *Bullying Beyond the Schoolyard: Preventing and Responding to Cyberbullying*: Corwin Press, 2014.
53. Holt, TJ; Burruss, GW; and Bossler, AM. Social learning and cyber-deviance: Examining the importance of a full social learning model in the virtual world. *Journal of Crime and Justice*, 33, 2 (2010), 31-61.
54. Hong, W and Thong, JY. Internet privacy concerns: An integrated conceptualization and four empirical studies. *MIS Quarterly*, 37, 1 (2013), 275-298.
55. Horton, JJ; Rand, DG; and Zeckhauser, RJ. The online laboratory: Conducting experiments in a real labor market. *Experimental Economics*, 14, 3 (2011), 399-425.
56. James, TL; Lowry, PB; Wallace, L; and Warkentin, M. The effect of belongingness on obsessive-compulsive disorder in the use of online social networks. *Journal of Management Information Systems*, in press, (2017),
57. Jasso, G. Factorial survey methods for studying beliefs and judgments. *Sociological Methods & Research*, 34, 3 (2006), 334-423.
58. John Carlo, B; Paul, TJ; and Justin, MG. Promoting transparency and accountability through ICTs, social media, and collaborative e-government. *Transforming Government: People, Process and Policy*, 6, 1 (2012), 78-91.
59. Kane, GC; Alavi, M; Labianca, G; and Borgatti, SP. What's different about social media networks? a framework and research agenda. *MIS Quarterly*, 38, 1 (2014), 275-304.
60. Kast, FE and Rosenzweig, JE. General systems theory: Applications for organization and management. *Academy of Management Journal*, 15, 4 (1972), 447-465.
61. Keith, MJ; Thompson, SC; Hale, J; Lowry, PB; and Greer, C. Information disclosure on mobile devices: Re-examining privacy calculus with actual user behavior. *International Journal of Human-Computer Studies*, 71, 12 (2013), 1163–1173.
62. Khansa, L; Kuem, J; Siponen, M; and Kim, SS. To cyberloaf or not to cyberloaf: The impact of the announcement of formal organizational controls. *Journal of Management Information Systems*, 34, 1 (2017), 141-176.
63. Kietzmann, JH; Hermkens, K; McCarthy, IP; and Silvestre, BS. Social media? Get serious! Understanding the functional building blocks of social media. *Business horizons*, 54, 3 (2011), 241-251.
64. Klein, G; Jiang, JJ; and Cheney, P. Resolving difference score issues in information systems research. *MIS Quarterly*, 33, 4 (2009), 811-826.
65. Knobel, C and Bowker, GC. Values in design. *Communications of the ACM*, 54, 7 (2011), 26-28.
66. Kowalski, RM; Giumetti, GW; Schroeder, AN; and Lattanner, MR. Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin*, 140, 4 (2014), 1073-1137.
67. Kuem, J; Ray, S; Siponen, M; and Kim, SS. What leads to prosocial behaviors on social networking services: A tripartite model. *Journal of Management Information Systems*, 34, 40-70 (2017),
68. Kwan, GCE and Skoric, MM. Facebook bullying: An extension of battles in school. *Computers in Human Behavior*, 29, 1 (2013), 16-25.
69. Lambropoulos, N; Faulkner, X; and Culwin, F. Supporting social awareness in collaborative e-learning. *British Journal of Educational Technology*, 43, 2 (2012), 295-306.

70. Lang, C and Barton, H. Just untag it: Exploring the management of undesirable Facebook photos. *Computers in Human Behavior*, 43, (2015), 147-155.
71. Lee, J; Crossler, R; and Warkentin, M. Implications of monitoring mechanisms on bring your own device (BYOD) adoption. *Journal of Computer Information Systems*, in press, (2016),
72. Lerner, JS and Tetlock, PE. Accounting for the effects of accountability. *Psychological Bulletin*, 125, 2 (1999), 255.
73. Liechti, O and Ichikawa, T. A digital photography framework supporting social interaction and affective awareness. In G. Goos, J. Hartmanis, and J.v. Leeuwen (eds.), *Handheld and Ubiquitous Computing*. Berlin Heidelberg: Springer, 1999, pp. 186-192.
74. Lovejoy, K and Saxton, GD. Information, community, and action: How nonprofit organizations use social media. *Journal of Computer-Mediated Communication*, 17, 3 (2012), 337-353.
75. Lowry, PB; Cao, J; and Everard, A. Privacy concerns versus desire for interpersonal awareness in driving the use of self-disclosure technologies: The case of instant messaging in two cultures. *Journal of Management Information Systems*, 27, 4 (2011), 163-200.
76. Lowry, PB; D’Arcy, J; Hammer, B; and Moody, GD. 'Cargo Cult’ science in traditional organization and information systems survey research: A case for using nontraditional methods of data collection, including Mechanical Turk and online panels. *Journal of Strategic Information Systems*, 25, 3 (2016), 232-240.
77. Lowry, PB and Gaskin, J. Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE Transactions on Professional Communication*, 57, 2 (2014), 123-146.
78. Lowry, PB; Moody, GD; Galletta, DF; and Vance, A. The drivers in the use of online whistle-blowing reporting systems. *Journal of Management Information Systems*, 30, 1 (2013), 153-190.
79. Lowry, PB; Posey, C; Bennett, RJ; and Roberts, TL. Leveraging fairness and reactance theories to deter reactive computer abuse following enhanced organisational information security policies: An empirical study of the influence of counterfactual reasoning and organisational trust. *Information Systems Journal*, 25, 3 (2015), 193–230.
80. Lowry, PB; Zhang, J; Wang, C; and Siponen, M. Why do adults engage in cyberbullying on social media? An integration of online disinhibition and deindividuation effects with the social structure and social learning (SSSL) model. *Information Systems Research*, 27, 4 (2016), 962-986.
81. Maner, JK; Gailliot, MT; Butz, DA; and Peruche, BM. Power, risk, and the status quo: Does power promote riskier or more conservative decision making? *Personality and Social Psychology Bulletin*, 33, 4 (2007), 451-462.
82. Marsh, HW and Hocevar, D. Application of confirmatory factor analysis to the study of self-concept: First- and higher order factor models and their invariance across groups. *Psychological Bulletin*, 97, 3 (1985), 562-582.
83. Mason, KL. Cyberbullying: A preliminary assessment for school personnel. *Psychology in the Schools*, 45, 4 (2008), 323-348.
84. Mason, W and Suri, S. Conducting behavioral research on Amazon’s Mechanical Turk. *Behavior Research Methods*, 44, 1 (2012), 1-23.
85. Matook, S; Cummings, J; and Bala, H. Are you feeling lonely? The impact of relationship characteristics and online social network features on loneliness. *Journal of Management Information Systems*, 31, 4 (2015), 278-310.
86. McCuddy, T and Vogel, M. Beyond Traditional Interaction: Exploring the functional form of the exposure-offending association across online network size. *Journal of Criminal Justice*, 43, 2 (2015), 89-98.
87. Menesini, E; Nocentini, A; and Calussi, P. The measurement of cyberbullying: Dimensional structure and relative item severity and discrimination. *Cyberpsychology, Behavior, and Social Networking*, 14, 5 (2011), 267-274.
88. Mohr, D; Cuijpers, P; and Lehman, K. Supportive accountability: A model for providing human support to enhance adherence to eHealth interventions. *Journal of Medical Internet Research*, 13, 1

(2011), e30.

89. Monks, CP; Smith, PK; Naylor, P; Barter, C; Ireland, JL; and Coyne, I. Bullying in different contexts: Commonalities, differences and the role of theory. *Aggression and Violent Behavior*, 14, 2 (2009), 146-156.
90. Nadler, DA and Tushman, ML. A model for diagnosing organizational behavior. *Organizational Dynamics*, 9, 2 (1980), 35-51.
91. Nan, N. Capturing bottom-up information technology use processes: A complex adaptive systems model. *MIS Quarterly*, 35, 2 (2011), 505-532.
92. Nan, N and Lu, Y. Harnessing the power of self-organization in an online community during organizational crisis. *MIS Quarterly*, 38, 4 (2014), 1135-1157.
93. Nobles, MR and Fox, KA. Assessing stalking behaviors in a control balance theory framework. *Criminal Justice and Behavior*, 40, 7 (2013),
94. Nobles, MR; Reyns, BW; Fox, KA; and Fisher, BS. Protection against pursuit: A conceptual and empirical comparison of cyberstalking and stalking victimization among a national sample. *Justice Quarterly*, 31, 6 (2012), 986-1014.
95. Paolacci, G; Chandler, J; and Ipeirotis, PG. Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making*, 5, 5 (2010), 411-419.
96. Patchin, JW and Hinduja, S. Bullies move beyond the schoolyard a preliminary look at cyberbullying. *Youth violence and juvenile justice*, 4, 2 (2006), 148-169.
97. Pempek, TA; Yermolayeva, YA; and Calvert, SL. College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, 30, 3 (2009), 227-238.
98. Pinsonneault, A and Heppel, N. Anonymity in group support systems research: A new conceptualization, measure, and contingency framework. *Journal of Management Information Systems*, 14, 3 (1998), 89-108.
99. Piquero, AR and Hickman, M. An empirical test of Tittle's control balance theory. *Criminology*, 37, 2 (1999), 319-342.
100. Piquero, AR and Hickman, M. Extending Tittle's control balance theory to account for victimization. *Criminal Justice and Behavior*, 30, 3 (2003), 282-301.
101. Piquero, AR; MacIntosh, R; and Hickman, M. Applying Rasch modeling to the validity of a control balance scale. *Journal of Criminal Justice*, 29, 6 (2001), 493-505.
102. Piquero, NL and Piquero, AR. Control balance and exploitative corporate crime. *Criminology*, 44, 2 (2006), 397.
103. Podsakoff, PM; MacKenzie, SB; Lee, JY; and Podsakoff, NP. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 5 (2003), 879-903.
104. Pogarsky, G and Piquero, AR. Studying the reach of deterrence: Can deterrence theory help explain police misconduct? *Journal of Criminal Justice*, 32, 4 (2004), 371-386.
105. Polites, GL; Roberts, N; and Thatcher, J. Conceptualizing models using multidimensional constructs: a review and guidelines for their use. *EJIS*, 21, 1 (2012), 22-48.
106. Posey, C; Lowry, PB; Roberts, TL; and Ellis, S. Proposing the online community self-disclosure model: The case of working professionals in France and the UK who use online communities. *European Journal of Information Systems*, 19, 2 (2010), 181-195.
107. Posey, C; Roberts, TL; Lowry, PB; Bennett, RJ; and Courtney, J. Insiders' protection of organizational information assets: Development of a systematics-based taxonomy and theory of diversity for protection-motivated behaviors. *MIS Quarterly*, 37, 4 (2013), 1189-1210.
108. Postmes, T; Spears, R; and Lea, M. Breaching or building social boundaries? SIDE-effects of computer-mediated communication. *Communication Research*, 25, 6 (1998), 689-715.
109. Postmes, T; Spears, R; Sakhel, K; and De Groot, D. Social influence in computer-mediated communication: The effects of anonymity on group behavior. *Personality and Social Psychology Bulletin*, 27, 10 (2001), 1243-1254.
110. Privitera, C and Campbell, MA. Cyberbullying: The new face of workplace bullying?

CyberPsychology & Behavior, 12, 4 (2009), 395-400.

111. Rahimi, B. The agonistic social media: Cyberspace in the formation of dissent and consolidation of state power in postelection Iran. *Communication Review*, 14, 3 (2011), 158-178.
112. Rebellon, CJ; Piquero, NL; Piquero, AR; and Tibbetts, SG. Anticipated shaming and criminal offending. *Journal of Criminal Justice*, 38, 5 (2010), 988-997.
113. Reicher, S and Levine, M. Deindividuation, power relations between groups and the expression of social identity: The effects of visibility to the out-group. *British Journal of Social Psychology*, 33, 2 (1994), 145-163.
114. Richardson, HA; Simmering, MJ; and Sturman, MC. A tale of three perspectives: Examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*, 12, 4 (2009), 762-800.
115. Riedl, C; Köbler, F; Goswami, S; and Krcmar, H. Tweeting to feel connected: A model for social connectedness in online social networks. *International Journal of Human-computer Interaction*, 29, 10 (2013), 670-687.
116. Rivituso, J. Cyberbullying victimization among college students: An interpretive phenomenological analysis. *Journal of Information Systems Education*, 25, 1 (2014), 71-75.
117. Rosen, LD; Whaling, K; Rab, S; Carrier, LM; and Cheever, NA. Is Facebook creating "iDisorders"? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety. *Computers in Human Behavior*, 29, 3 (2013), 1243-1254.
118. Rothe, DL and Mullins, CW. Toward a criminology of international criminal law: An integrated theory of international criminal violations. *International Journal of Comparative and Applied Criminal Justice*, 33, 1 (2009), 97-118.
119. Runions, K; Shapka, JD; Dooley, J; and Modecki, K. Cyber-aggression and victimization and social information processing: Integrating the medium and the message. *Psychology of Violence*, 3, 1 (2013), 9-26.
120. Sabella, RA; Patchin, JW; and Hinduja, S. Cyberbullying myths and realities. *Computers in Human Behavior*, 29, 6 (2013), 2703-2711.
121. Sagioglou, C and Greitemeyer, T. Facebook's emotional consequences: Why Facebook causes a decrease in mood and why people still use it. *Computers in Human Behavior*, 35, (2014), 359-363.
122. Sarker, S; Chatterjee, S; and Xiao, X. How "Sociotechnical" is our IS Research? An Assessment and Possible Ways Forward. Presented at *34th Interational Confernce on Information Systems (ICIS 2013)*, Milan, Italy, 2013.
123. Sauder, M and Espeland, WN. The discipline of rankings: Tight coupling and organizational change. *American Sociological Review*, 74, 1 (2009), 63-82.
124. Schlenker, BR; Britt, TW; Pennington, J; Murphy, R; and Doherty, K. The triangle model of responsibility. *Psychological review*, 101, 4 (1994), 632-652.
125. Schulze, T; Krug, S; and Schader, M. Workers' task choice in crowdsourcing and human computation markets. Presented at *2012 International Conference on Information Systems (ICIS 2012)*, Orlando, FL, 2012.
126. Schwarz, A; Rizzuto, T; Carraher-Wolverton, C; Roldán, JL; and Barrera-Barrera, R. Examining the impact and detection of the 'urban legend' of common method bias. *Database for Advances in Information Systems*, 48, 1 (2017), 93-119.
127. Scott, SV and Orlikowski, WJ. Reconfiguring relations of accountability: Materialization of social media in the travel sector. *Accounting, Organizations and Society*, 37, 1 (2012), 26-40.
128. Scott, SV and Orlikowski, WJ. Entaglements in practice: Performing anonymity through social media. *MIS Quarterly*, 38, 3 (2014), 873-893.
129. Sharma, R; Yetton, P; and Crawford, J. Estimating the effect of common method variance: The method—method pair technique with an illustration from TAM research. *MIS Quarterly*, 33, 3 (2009), 473-490.
130. Shein, E. Ephemeral data. *Communications of the ACM*, 56, 9 (2013), 20-22.
131. Shen, KN and Khalifa, M. Design for social presence in online communities: A multidimensional

approach. *AIS Transactions on Human-Computer Interaction*, 1, 2 (2009), 33-54.

132. Sia, C-L; Tan, BCY; and Wei, K-K. Group Polarization and Computer-Mediated Communication: Effects of Communication Cues, Social Presence, and Anonymity. *Information Systems Research*, 13, 1 (2002), 70-90.
133. Simola, S. Understanding Moral Courage Through a Feminist and Developmental Ethic of Care. *Journal of Business Ethics*, 130, 1 (2015), 29-44.
134. Siponen, M and Vance, A. Neutralization: new insights into the problem of employee systems security policy violations. *MIS Quarterly*, 34, 3 (2010), 487-502.
135. Slonje, R; Smith, PK; and Frisén, A. Processes of cyberbullying, and feelings of remorse by bullies: A pilot study. *European Journal of Developmental Psychology*, 9, 2 (2012), 244-259.
136. Slonje, R; Smith, PK; and Frisén, A. The nature of cyberbullying, and strategies for prevention. *Computers in Human Behavior*, 29, 1 (2013), 26-32.
137. Spears, BA and Zeederberg, M. Emerging Methodological Strategies to Address Cyberbullying: Online Social Marketing and Young People as Co-Researchers. In S. Bauman, D. Cross, and J. Walker (eds.), *Principles of Cyberbullying Research, Definitions, Measures, and Methodology*. New York: Routledge, 2013, pp. 196-209.
138. Squicciarini, A; Mont, MC; and Rajasekaran, SD. Using Modeling and Simulation to Evaluate Enterprises' Risk Exposure to Social Networks. *Computer*, 44, 1 (2010), 66-7.
139. Steinbauer, R; Renn, RW; Taylor, RR; and Njoroge, PK. Ethical leadership and followers' moral judgment: The role of followers' perceived accountability and self-leadership. *Journal of Business Ethics*, 120, 3 (2014), 381-392.
140. Sugarman, DB and Willoughby, T. Technology and violence: Conceptual issues raised by the rapidly changing social environment. *Psychology of Violence*, 3, 1 (2013), 1-8.
141. Suleiman, J and Watson, RT. Social loafing in technology-supported teams. *Computer Supported Cooperative Work*, 17, 4 (2008), 291-309.
142. Swearer, SM; Espelage, DL; Vaillancourt, T; and Hymel, S. What can be done about school bullying? Linking research to educational practice. *Educational Researcher*, 39, 1 (2010), 38-47.
143. Tadmor, C and Tetlock, PE. Accountability. In D. Matsumoto (ed.), *The Cambridge Dictionary of Psychology*. Cambridge: Cambridge University Press, 2009, pp. 8.
144. Teo, TS and Men, B. Knowledge portals in Chinese consulting firms: a task–technology fit perspective. *European Journal of Information Systems*, 17, 6 (2008), 557-574.
145. Titah, R and Barki, H. Nonlinearities between attitude and subjective norms in information technology acceptance: A negative synergy? *MIS Quarterly*, 33, 4 (2009), 827-844.
146. Tittle, CR. *Control balance: Toward a general theory of deviance*. Boulder, CO: Westview Press, 1995.
147. Tittle, CR. Thoughts Stimulated by Braithwaite's Analysis of Control Balance Theory. *Theoretical Criminology*, 1, 1 (1997), 99-110.
148. Tittle, CR. Continuing the discussion of control balance. *Theoretical Criminology,* 3, 3 (1999), 344-352.
149. Tittle, CR. Refining control balance theory. *Theoretical Criminology,* 8, 4 (2004), 395-428.
150. Tokunaga, RS. Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior*, 26, 3 (2010), 277-287.
151. Trinkle, BS; Crossler, RE; and Warkentin, M. I'm game, are you? Reducing real-world security threats by managing employee activity in online social networks. *Journal of Information Systems*, 28, 2 (2014), 307-327.
152. Utz, S and Beukeboom, CJ. The role of social network sites in romantic relationships: Effects on jealousy and relationship happiness. *Journal of Computer-Mediated Communication*, 16, 4 (2011), 511-527.
153. Utz, S; Tanis, M; and Vermeulen, I. It is all about being popular: The effects of need for popularity on social network site use. *Cyberpsychology, Behavior, and Social Networking*, 15, 1 (2012), 37-42.
154. Vance, A; Lowry, PB; and Eggett, D. Using accountability to reduce access policy violations in

information systems. *Journal of Management Information Systems*, 29, 4 (2013), 263-290.

155. Vance, A; Lowry, PB; and Eggett, DL. A new approach to the problem of access policy violations: Increasing perceptions of accountability through the user interface. *MIS Quarterly*, 39, 2 (2015), 345–366.
156. Venkatesh, V and Goyal, S. Expectation disconfirmation and technology adoption: Polynomial modeling and response surface analysis. *MIS Quarterly*, 34, 2 (2010), 281-303.
157. Venkatraman, N. The concept of fit in strategy research: Toward verbal and statistical correspondence. *Academy of Management Review*, 14, 3 (1989), 423-444.
158. Walker, J; Craven, RG; and Tokunaga, RS. Introduction. In S. Bauman (ed.), *Principles of Cyberbullying Research: Definitions, Measures, and Methodology*. New York: Routledge, 2013, pp. 32-34.
159. Wallander, L. 25 years of factorial surveys in sociology: A review. *Social Science Research*, 38, 3 (2009), 505-520.
160. Walther, JB and Bunz, U. The rules of virtual groups: Trust, liking, and performance in computer-mediated communication. *Journal of Communication*, 55, 4 (2005), 828-846.
161. Wang, ET and Tai, JC. Factors affecting information systems planning effectiveness: organizational contexts and planning systems dimensions. *Information & Management*, 40, 4 (2003), 287-303.
162. Wang, N; Xue, Y; Liang, H; and Ge, S. The road to business-IT alignment: A case study of two Chinese companies. *Communications of the Association for Information Systems*, 28, 1 (2011), 415-436.
163. Williams, KS. Using Tittle's control balance theory to understand computer crime and deviance. *International Review of Law Computers & Technology*, 22, 1-2 (2008), 145-155.
164. Wood, PB and Dunaway, RG. An application of control balance theory to incarcerated sex offenders. *Journal of the Oklahoma Criminal Justice Research Consortium*, 4, 1 (1997), 1-12.
165. Wood, PB; Wilson, JA; and Thorne, DP. Offending patterns, control balance, and affective rewards among convicted sex offenders. *Deviant Behavior*, 36, 5 (2015), 368-387.
166. Yarbrough, L; Morgan, NA; and Vorhies, DW. The impact of product market strategy-organizational culture fit on business performance. *Journal of the Academy of Marketing Science*, 39, 4 (2011), 555-573.
167. Yu, K; Cadeaux, J; and Song, H. Alternative forms of fit in distribution flexibility strategies. *International Journal of Operations & Production Management*, 32, 10 (2012), 1199-1227.
168. Zhou, L; Burgoon, JK; Twitchell, DP; Qin, T; and Nunamaker Jr, JF. A comparison of classification methods for predicting deception in computer-mediated communication. *Journal of Management Information Systems*, 20, 4 (2004), 139-166.

[i] FSM combines the advantages of experiments and surveys and allows for the orthogonal testing of many design factor combinations not possible in experiments. We explain FSM in depth in the methodology section.

[ii] CBT recognizes that power differentials manifest themselves as control imbalances and, as such, refers to power and control in the same vein and often together [163, 165].

[iii] However, recent work is beginning to recognize that an analysis of individual differences of cyberbully victims can also be valuable. For example, a recent study by Lang and Barton [70] notes that how individuals coped with and reacted to harassing behavior (e.g., posting/tagging undesirable Facebook photos) on social media was contingent on their personality type (e.g., agreeableness) and age.

In another surprising revelation, Sagioglou and Greitemeyer [121] noted that the longer one spent time on Facebook, the worse off one's mood became. Inferring from such observations, time spent on social media can also be a crucial factor in determining one's responses. Thus, if someone who has spent more time on social media perceives an act of CB, then his/her negative feeling/reaction would certainly be more intense than someone who has spent less time on social media and thus is in a comparatively better mood. In such situations of emotional duress (due to longer time spent or any other factors including, perhaps, a prior history on social media or personal/professional misfortune), a seemingly innocuous joke could be perceived by the receiver as being an act of CB, when, in fact, it was not intended to be.

[iv] Accountability is likewise crucial to a study of sociotechnical systems. Sociotechnical systems consist of relations between the social and the technical; therefore, an understanding of human values often becomes crucial to the design of sociotechnical systems. In fact, there is a large body of work in this area, called value sensitive design, that argues for and develops sociotechnical systems based on human values. One of the key human values considered in this area is accountability. For example, some research [42] argues for designing systems that promote accountability, openness, and credibility.

[v] We based our definition of social anonymity on the rich anonymity literature of Pinsonneault and Heppel [98] and Lowry et al. [78]. In particular, we used two key subconstructs that best fit social networking: diffused responsibility is the degree to which a potential cyberbully believes that he or she will be held accountable for his or her abusive behavior in social media, and knowledge of others is the degree to which a potential cyberbully believes that others in the social media system know the person well enough to recognize the perpetrator, even if he or she was not personally identified. We omitted the subconstruct of lack of proximity because virtually all social media interactions are nonproximate. Likewise, the concept of confidence in the system to function is not meaningful because the social media platforms our users use (e.g., Facebook, LinkedIn) are stable and not prone to errors. Finally, the idea of lack of identification (the degree to which a potential cyberbully believes his or her personal identity will not be revealed by the social media system) is also not particularly relevant because this decision is primarily up to the individual.

[vi] The reader is referred to Venkatraman's [157] paper for an extended discussion of these different kinds of fit, which we omit here for the sake of brevity.

[vii] An illustration of a covariance fit is found in [12], which conceptualizes a construct called the high performance work system (HPWS) that combines four factors (selective staffing, comprehensive training, developmental performance appraisal, and equitable reward systems) and one observable indicator (performance-based pay). HPWS captures how well these dimensions are internally consistent with one another. Statistically, this implies that the common variation of HPWS dimensions is explained by a latent factor (HPWS) that captures their covariance. In modeling terms, the first-order factors now operate as dependent variables of the second-order latent factor [12]. That is, covariance fit captures the logical consistency and link between the first order factors, which are then combined via factor analysis, into the second-order fit [157]. Based on this, covariance fit is a second-order reflective construct where the first-order constructs could be either formative or reflective:

> *With its emphasis on internal consistency, the covariation perspective is no different from a reflective second-order construct, where the dimensions co-vary. We also note that fit as covariation does not specify the nature of the first-order dimensions; hence, the first-order dimensions can be formative or reflective. [105, p. 34]*

Covariance fit is one way of understanding holistic fit. Components making up the covariance fit are often insufficient to describe a system and its effects. However, when the components are taken together as a covariance fit, they offer a meaningful conception of how a system affects further outcomes [25].

[viii] From an SEM perspective, fit as covariation is implemented as a CFA, where the latent factor (the fit, which in our case is ITCBPC) represents the co-alignment of multiple factors (i.e., the IT design factors) of interest. The fit itself cannot be directly measured through observable indicators [166]. Therefore, a common strategy of assessing the fit is to model it as a factor analysis [157].

[ix] *Deindividuation* is a "decrease in self-observation, self-evaluation, and concern for social comparison and

evaluation” [22, p. 3044]. Vance et al. [155] noted that studies have found that when people feel deindividuated, they are less restrained in their normal behaviors [113], which particularly occurs in temporally and spatially dispersed settings such as social media contexts [29].

[x] mTurk is an online marketplace for crowdsourcing work tasks in which one can post so-called “human intelligence tasks” that are self-selected and solved by people all over the world [125]. Studies in different research areas have shown that the experimental results from participants recruited on MTurk are comparable to those of lab experiments or online experiments with student participants, and obtaining results is faster and less expensive than with traditional data-gathering methods [55, 84, 95]. These studies have also shown that the demographics of the MTurk subjects are more diverse than those of traditional study subjects (e.g., students), and MTurk’s relatively low pay does not produce results that are more substandard than studies offering much higher compensation. Hence, MTurk leverages the many benefits of online market research panels—such as increased generalizability, better random sampling from target populations, increased distance between researchers and subjects, and increased actual and perceived anonymity [e.g., 78, 79, 107]—without the delays and higher expenses associated with market panels.

[xi] A total of 298 males (58.8%) and 209 females (41.2%) successfully completed the study (n=507). The average participant age was 33.19 years of age, with a standard deviation of 10.45 years. Within our sample, participants identified themselves as having completed less than high school (n = 1, 0.2%), high school only (n = 40, 7.9%), some university or college (n = 101, 19.9%), an associate’s degree (n = 54, 10.6%), a bachelor’s degree (n = 227, 44.7%), a master’s degree (n = 85, 16.7%), or a doctorate degree (n = 4, 0.8%). Within our sample, the participants identified themselves as part-time students (n = 83, 16.3%), full-time students only (n = 54, 10.6%), and students working full-time (n = 322, 63.4%), with the remainder identifying as unemployed (n = 53, 10.4%). Our sample had an average work experience of 10.84 years, with a standard deviation of 10.09.

[xii] Convergent and discriminant validities were assessed with STATA’s confirmatory factor analysis (CFA). As per CB-SEM standards literature [54], the model fit was good: $\chi2310 = 997.543$; $\chi2/df = 3.22$; CFI= 0.943; TLI = 0.935; RMSEA = 0.068; SRMR = 0.074; CD = 1.000. The convergent validity was supported by large and standardized loadings for all constructs ($p < .001$) and t-values that exceeded statistical significance. Convergent validity was also supported by calculating the ratio of factor loadings to their respective standard errors that exceed |10.0| ($p < .001$) [46]. Discriminant validity was tested by showing that the measurement model had a significantly better model fit than a competing model with a single latent construct and was better than all other competing models in which all potential pairings of latent constructs were joined. The $\chi2$ differences between all competing models were significantly larger than that of the original measurement model; this was also suggested by factor loadings, modification indices, and residuals [82].

[xiii] To test for CMB, a marker variable (resentment) was entered into the model. We followed established procedures to analyze the impact on common method bias on our sample [129]. The results of resentment as a marker variable onto our dependent had a small, insignificant effect ($\beta = 0.081$, t = 1.90, $p = 0.057$) on our intention variable, indicating that CMB is not likely present in our data. However, the marker variable technique is likely to under correct for CMB; thus, we cannot rule it out completely as a possibility [129]. Although, a more recent study is more optimistic about this issue [126].

[xiv] Its coefficient in the models that we ran was usually between -0.01 and -0.06, with standard errors around .10, resulting in t-values that tended to be between .8 and 1.6; this resulted in a nonsignificant finding in all models. Nor did it moderate the effect of control imbalance onto the intention to engage in cyberbullying (t = 1.02, $p < .310$).

[xv] An exploratory factor analysis of the items supports this notion; the first eigenvalue (7.75) is the sole value above 1.00 and should thus be retained. The first eigenvalue also accounts for 92.6% of the variation in the model. Covariance fit is supported when the second-order factor comprised of the ITCBPC is more predictive (based on the R^2 score) of the dependent variable than the dimensions’ individual main effects on the dependent variable [157], which, in our case, is control imbalance. In addition, the data better fit a covariance model, as demonstrated by a lower χ^2 statistic. Table E1 reports the results of this analysis. Moreover, when we tried analysis by individually examining the IT design artifacts, the resulting model fit was unacceptable. These analyses reveal that the covariance fit model had both better predictive power and was better fit to the data, thus supporting our notion of covariance as fit for ITCBPC. Additional information regarding descriptive statistics and the scenarios from the study are included in Appendix C.

Table E1. The Test of Covariance Fit for the IT Cyberbully Prevention Capability

Dep. variable *(Y)*	**R^2 for main effects model**	**χ^2 for main effects model**	**R^2 for covariance fit model**	**χ^2 for covariance fit model**	**Fit as covariance accepted?**
CI	.260	2118.62	.264	1419.65	Yes

[xvi] The model here shows only the relationships until a squared term. We tested the relationships using other nonlinear terms, such as cubic terms or higher, logarithmic relationships, and exponential relationships. In all cases, these other possible nonlinear relationships suffered from poor model fit and less explanatory power. Therefore, it was obvious that the nonlinear relationships until a squared term best captured the relationships between our constructs.

[xvii] For example, researchers have argued that social media environments are often "…spheres of…hegemony [**power**]…leading to greater fragmentation of social relations…" and are "operated, developed, and creatively transformed by users who could potentially reshape their everyday surroundings according to their online activities" [emphasis added], thereby becoming breeding grounds for "contentious performances in the public sphere" [111, p. 161].

[xviii] Technological advances have had a role in altering violent behavior…technology has increased the efficiency and the ease by which people can harm others…a range of newer communication devices…may serve as aids for individuals who stalk [and harm] their…partners. [140, p. 1-2]

[xix] This relatively new perspective regards sociotechnical systems, including social media, as complex dynamic systems [45] that often work most profitably on the "edge of chaos." An edge of chaos perspective argues that some degree of misalignment is necessary because it provides an impetus for better outcomes. From a systems theory perspective, this means that some level of entropy is required to keep the system functioning better [60]; otherwise, systems tend to become less valuable due to inertia and their efficacy to produce better outcomes (here, accountability) decreases [162].

[xx] For example, a recent study [70] notes that how individuals coped with and reacted to harassing behavior (posting/tagging undesirable photos) on social media was contingent on their personality type (e.g., agreeableness) and age. Another study [121] noted that the longer the time one spent on Facebook, the worse off one's mood became.

Using IT Design to Prevent Cyberbullying

ONLINE APPENDIX A. STUDY INSTRUMENTATION

Table A.1. Pre-Factorial Survey Demographic Variables and Covariates

Variable / Construct	**Item / Scale**
Gender	Male / Female
Age	Enter age ___ (Verify content is numeric)
Education	1=Less than high school / secondary school 2=High school / secondary school 3=Some university, but have not completed a degree 4=Associate's degree 5=Bachelor's degree 6=Master's degree 7=Doctorate / Ph.D.
Current Status	1=Student; 2=Some/Part Employment; 3=Fully employed; 4=Unemployed
Computer proficiency	How would you evaluate your computer skills in general? [1=poor,2= fair, 3=good, 4=very good, 5=excellent]
Computer experience	How long have you been using a computer (in years)?
Social media experience	How long have you been using any form of social media (e.g., Facebook, LinkedIn, Instagram, instant messaging, Skype)?
Social media hours	On average, note the number of hours a day that you use any form of social media for any purpose (0 to 24 hours). [numeric entry]
Number of years full-time work experience	[numeric entry]
Cyberbullying habit	How often would you say that you have a habit or pattern of engaging in cyberbullying behaviors online such as saying hurtful things to others, acting rudely to others, trying to embarrass others, or making fun of others? **Scaling:** 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Very frequently
Cyberbullying victim	As just described, have you ever been a victim of cyberbullying? (yes/no)
Cyberstalking habit	How often would you say that you have a habit or pattern of engaging in cyberstalking behaviors online such as sending threatening/harassing messages, monitoring someone without their knowledge, sending obscene materials or messages to offend someone, sending viruses, or revealing highly private information that is intended to harm others? **Scaling:** 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, 5=Very frequently
Cyberstalking victim	As just described, have you ever been a victim of cyberstalking? (yes/no)
Resentment [13] Marker variable	• At times I feel I get a raw deal out of life • When I look back on what's happened to me, I can't help feeling really resentful • Other people always seem to get the breaks that I do not get.
Low self-control [3]	• I try to look out for myself first, even if it means making things difficult for other people. • I have little sympathy for other people when they are having problems. • If things I do upset people, it's their problem not mine. • I will try to get the things I want even when I know it's causing problems for other people.

Table A.2. Post-manipulation Instrumentation

Construct / Source	**Prompts and Items**
Social anonymity: based on knowledge of others (KO) diffused responsibility (DR) from [5]	Given the social media scenario just described, please indicate the degree to which the following would be true if you used the same or a similar **social media system** in your personal interactions: • **A-KO1**. Other people who would notice my behavior(s) on the system would not know me well enough to identify me as the person behind the behavior(s). • **A-KO2.** My system comment(s) would NOT have enough distinguishing characteristics that would allow other people to identify me as the originator of the comment (s). • **A-KO3.** It would be impossible to identify me as the origin of the comment(s) based on my personal characteristics. • **A-DR1.** All people on the site would be equally liable for any abusive behaviors or comments; I would not be singled out. • **A-DR2.** It would be impossible to make me more responsible than others for my behaviors on the site. • **A-DR3.** It would be impossible to blame me personally for any abusive comments on the site. • **A-DR4**. I cannot be blamed for my actions or behaviors on this site.
Social presence awareness (SP) [1]	[continuation of previous prompt] • **SP1.** I would feel a sense of human contact while using the system • **SP2.** I would experience a sense of personalness • **SP3.** I would feel a sense of sociability • **SP4.** I would notice a sense of human warmth • **SP5.** I would perceive a sense of human sensitivity
Evaluation awareness (EA) [10]	[continuation of previous prompt] • **EA1.** I could be evaluated on my online actions • **EA2.** Others would assess my online actions and comments on the system • **EA3.** The actions and comments I would take on the system would be judged by others • **EA4.** I would expect others would evaluate what I did on the system
Monitoring awareness (AM) [2]	[continuation of previous prompt] • **AM1.** My online actions could be monitored using computer technology. • **AM2.** Whatever I did on the system could be tracked using computer technology • **AM3.** Others could use computer technology to be aware of my actions • **AM4.** Computer technology would likely help others know what I did
Control subjected (CS) [7]	On a scale of 0 – 10, where 0 = *no control*, 5 = *medium control*, and 10 = total control, consider what your social interaction would be like under the social media system just described, and answer: ‘‘how much control would the following people have over you while interacting online with this system?’’

	• **CS1.** Individuals you would be connected to • **CS2.** Other people whom you would interact with • **CS3.** People whom you would meet • **CS4.** Individuals with whom you would interact • **CS5.** Specific friendships • **CS6.** Relationships with significant others
Control exerted (CE) [7]	Control exercised. On a scale of 0 – 10, where 0 = *no control,* 5= *medium control*, and 10 = *total contro*l, ‘‘how much control would you have over the following people while interacting online with the same system?” • **CE1.** Individuals you would be connected to • **CE2.** Other people whom you would interact with • **CE3.** People whom you would meet • **CE4.** Individuals with whom you would interact • **CE5.** Specific friendships • **CE6.** Relationships with significant others
Scenario realism (covariate) [3]	Please consider what the main character in the scenario did on social media, and answer the following: How realistic do you think this scenario is for actual social media use? That is, to what degree do you think that acts like this occur in real life (regardless of whether this has happened to you or not? 1=absolutely not realistic, 2=not very realistic, 3=neutral, 4=somewhat realistic, 5=very realistic
Intentions (Int) [3]	[continuation of previous prompt] • **Int1.** It is likely that I would have done what the main character did If I were in the same situation • **Int2.** I could see myself doing what the main character did if I were in the same situation. • **Int3.** I would possibly do what the main character did if I were in the same situation.

Except where indicated, responses defaulted to a 7-point Likert-type scale (1=strongly disagree, 2=disagree, 3=slightly disagree, 4=neutral, 5=slightly agree, 6=agree, 7=strongly agree).

ONLINE APPENDIX B. PROCEDURES AND SOCIAL NETWORK MANIPULATIONS EXAMPLES

Procedures

Subjects first completed a pre-manipulation survey in which they provided responses to demographic, personality, and experiential measures (see Appendix A). After being provided further instructions, the subjects were shown various pages on the social networking site with highlighted areas to make the manipulations of our study clear. Subjects were shown the following pages with the randomized graphical and textual manipulations so that they could best understand the design, expectations, and culture of the social networking site design: (1) profile page, (2) newsfeed page, (3) page highlighting restrictions placed on messaging, (4) page highlighting restrictions placed on posting to others' walls, (5) newsfeed page with a pop-up notifying the user of the current monitoring being employed on the network, and (6) newsfeed page with a pop-up manipulation of the subject's expectations regarding whether or not others would be evaluating their behaviors on the social network. The example treatment condition mockups are shown in Appendix B.

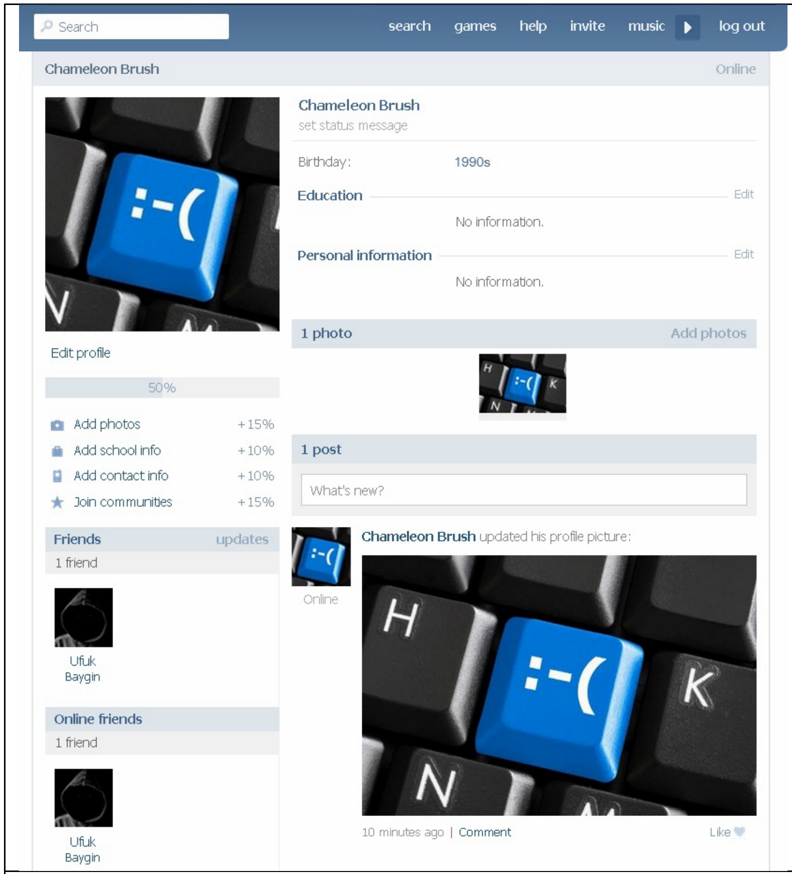
After the subjects viewed the social networking site, they were asked to respond to items assessing the constructs related to the design of the social networking site. These covered social anonymity, social presence awareness, evaluation awareness, monitoring awareness, and control imbalance.

Participants were then shown a scenario regarding CB. A mix of CB scenarios was used to account for the variety of CB behaviors that occur across social networking sites throughout the world. All scenarios were gathered from real-world examples posted on online forums devoted to CB. We also designed the response of the subject of the vignette (i.e., "John") to randomly vary for each scenario, with the riskiness of the response ranging from highly risky to slightly risky (see Appendix C). Again, this allowed for more contextual realism and the ability to more effectively test likely realistic responses.

Subjects were then asked to respond to constructs related to the scenario. These included realism, intention, moral beliefs, informal risks, certainty of punishment, and severity of punishment. Subjects repeated this process two more times, beginning with a newly assigned randomized social network manipulation and a newly assigned randomized scenario.

This process allowed us to create a large orthogonal matrix involving 240 randomized combinations of scenarios, vignettes, and responses. As a key feature of FSM, such a full matrix that is randomized makes it devoid of multicollinearity, yet enriched with design and contextual details that could not be tested in any other way [12].

Manipulation Examples



Chameleon Brush Online

Chameleon Brush
set status message

Birthday: 1990s

Education Edit
No information.

Personal information Edit
No information.

1 photo Add photos

1 post

What's new?

Chameleon Brush updated his profile picture:
Online

10 minutes ago | Comment

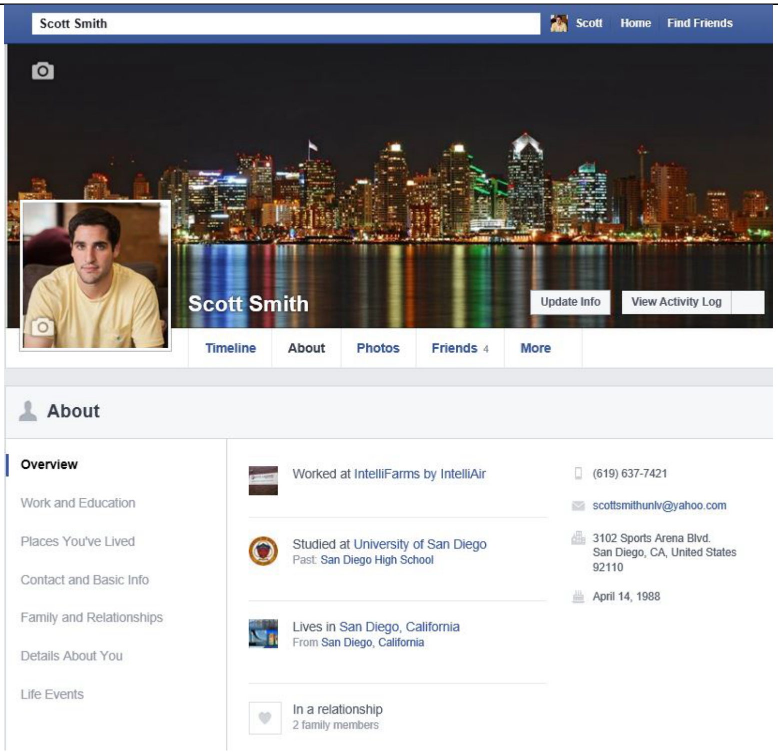
50%

Add photos +15%
Add school info +10%
Add contact info +10%
Join communities +15%

Friends updates
1 friend
Ufuk Baygin

Online friends
1 friend
Ufuk Baygin

High social anonymity profile page on VK network



Scott Smith

Scott Smith

About

Worked at IntelliFarms by IntelliAir

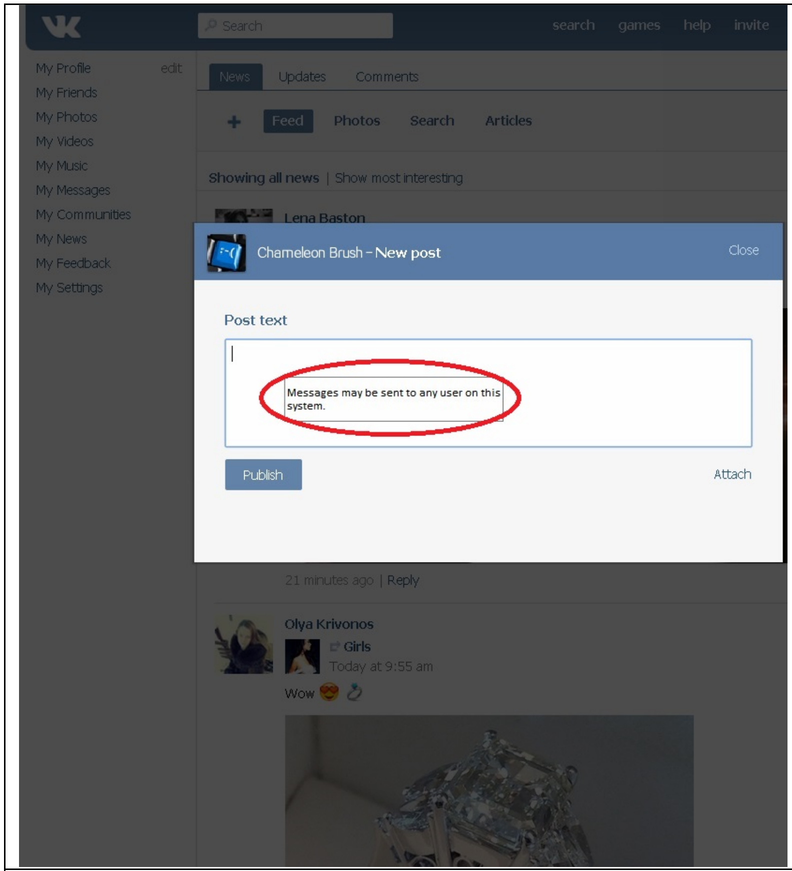
Studied at University of San Diego
Past: San Diego High School

Lives in San Diego, California
From San Diego, California

In a relationship
2 family members

(619) 637-7421
scottsmithunlv@yahoo.com
3102 Sports Arena Blvd.
San Diego, CA, United States
92110
April 14, 1988

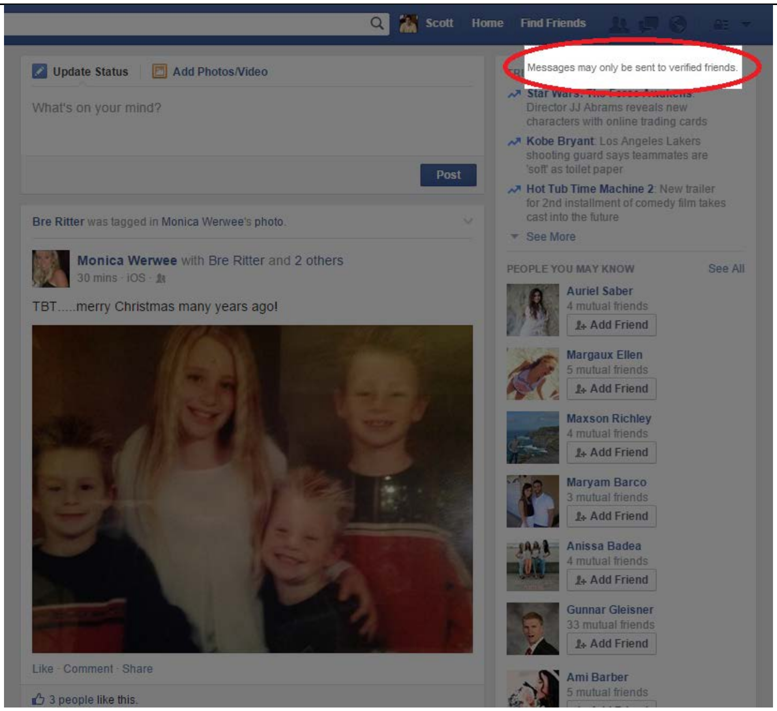
Low social anonymity profile page on Facebook



Messages may be sent to any user on this system.

Wow

High social anonymity VK condition. Message restriction highlights manipulation of increased social anonymity



Messages may only be sent to verified friends.

Star Wars: The Force Awakens: Director JJ Abrams reveals new characters with online trading cards

Kobe Bryant: Los Angeles Lakers shooting guard says teammates are 'soft' as toilet paper

Hot Tub Time Machine 2: New trailer for 2nd installment of comedy film takes cast into the future

Bre Ritter was tagged in Monica Werwee's photo.

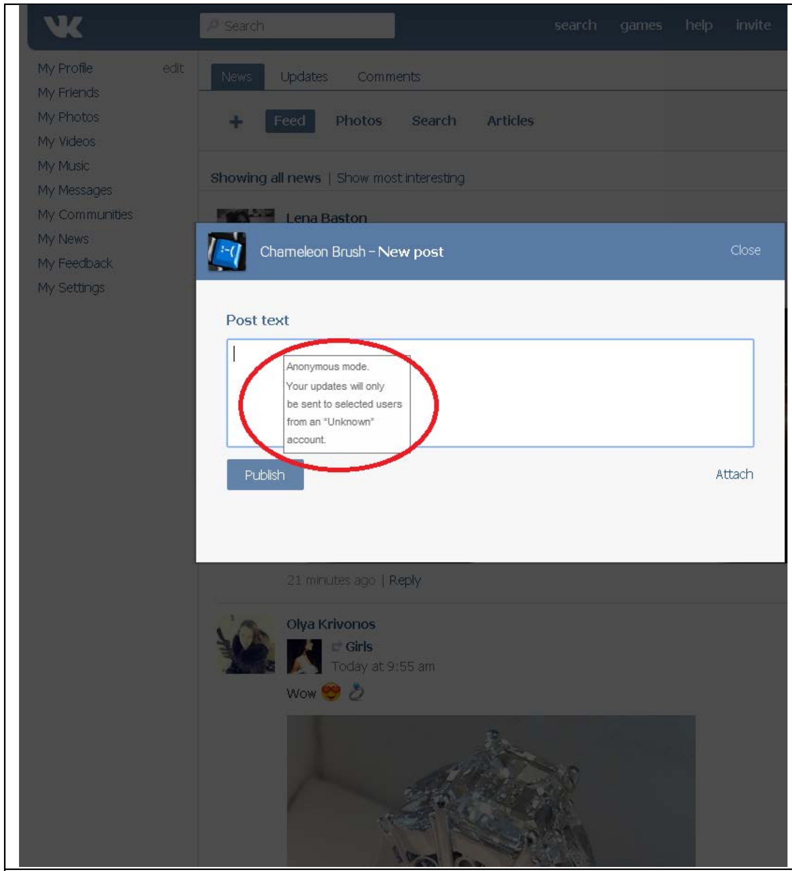
Monica Werwee with Bre Ritter and 2 others
30 mins · iOS

TBT.....merry Christmas many years ago!

3 people like this.

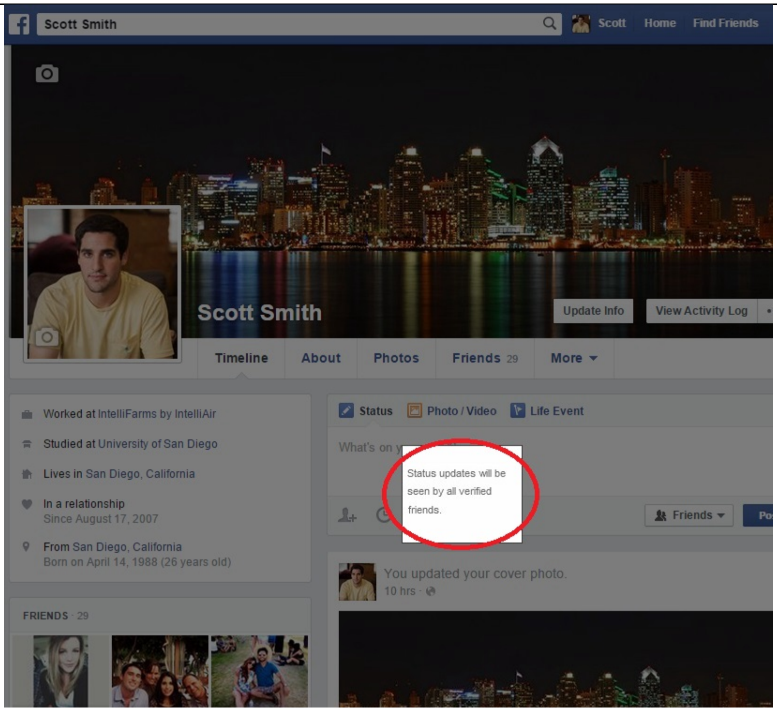
Auriel Saber – 4 mutual friends
Margaux Ellen – 5 mutual friends
Maxson Richley – 4 mutual friends
Maryam Barco – 3 mutual friends
Anissa Badea – 4 mutual friends
Gunnar Gleisner – 33 mutual friends
Ami Barber – 5 mutual friends

Low social anonymity Facebook condition. Message restriction highlights manipulation of decreased social anonymity



Anonymous mode. Your updates will only be sent to selected users from an "Unknown" account.

High social anonymity VK condition. Message restriction highlights manipulation of increased social anonymity, page 2.



Worked at IntelliFarms by IntelliAir

Studied at University of San Diego

Lives in San Diego, California

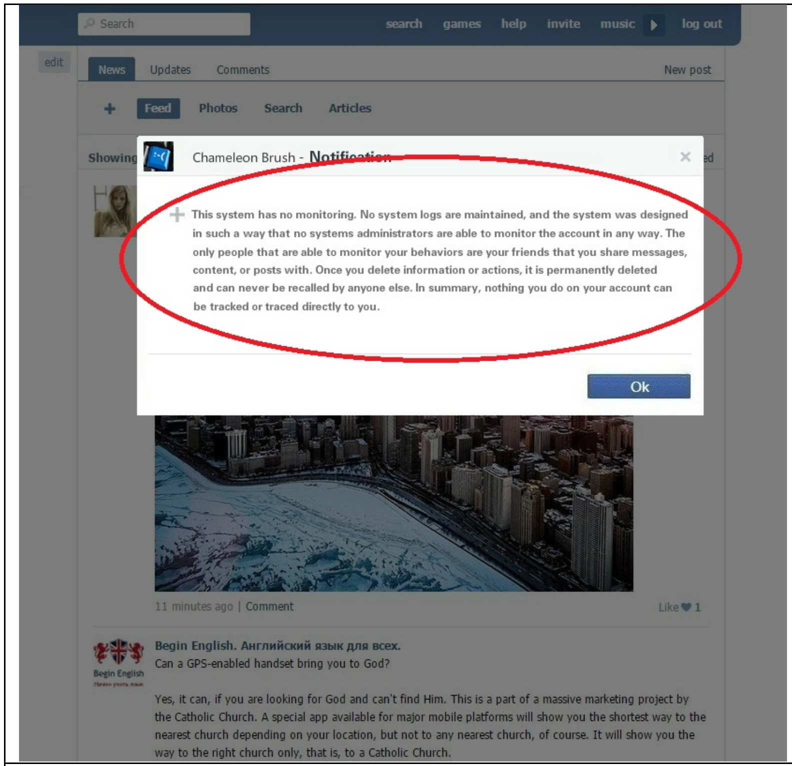
In a relationship
Since August 17, 2007

From San Diego, California
Born on April 14, 1988 (26 years old)

Status updates will be seen by all verified friends.

You updated your cover photo.
10 hrs ·

Low social anonymity Facebook condition. Message restriction highlights manipulation of decreased social anonymity, page 2



Chameleon Brush - Notification

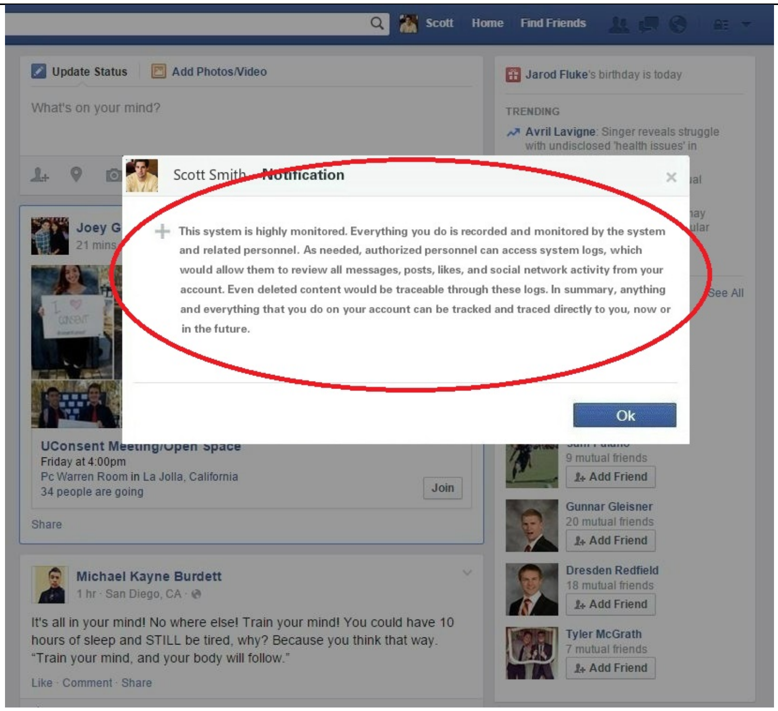
This system has no monitoring. No system logs are maintained, and the system was designed in such a way that no systems administrators are able to monitor the account in any way. The only people that are able to monitor your behaviors are your friends that you share messages, content, or posts with. Once you delete information or actions, it is permanently deleted and can never be recalled by anyone else. In summary, nothing you do on your account can be tracked or traced directly to you.

Begin English. Английский язык для всех.

Can a GPS-enabled handset bring you to God?

Yes, it can, if you are looking for God and can't find Him. This is a part of a massive marketing project by the Catholic Church. A special app available for major mobile platforms will show you the shortest way to the nearest church depending on your location, but not to any nearest church, of course. It will show you the way to the right church only, that is, to a Catholic Church.

High social anonymity VK condition. Low monitoring manipulation notification.



Scott Smith - Notification

This system is highly monitored. Everything you do is recorded and monitored by the system and related personnel. As needed, authorized personnel can access system logs, which would allow them to review all messages, posts, likes, and social network activity from your account. Even deleted content would be traceable through these logs. In summary, anything and everything that you do on your account can be tracked and traced directly to you, now or in the future.

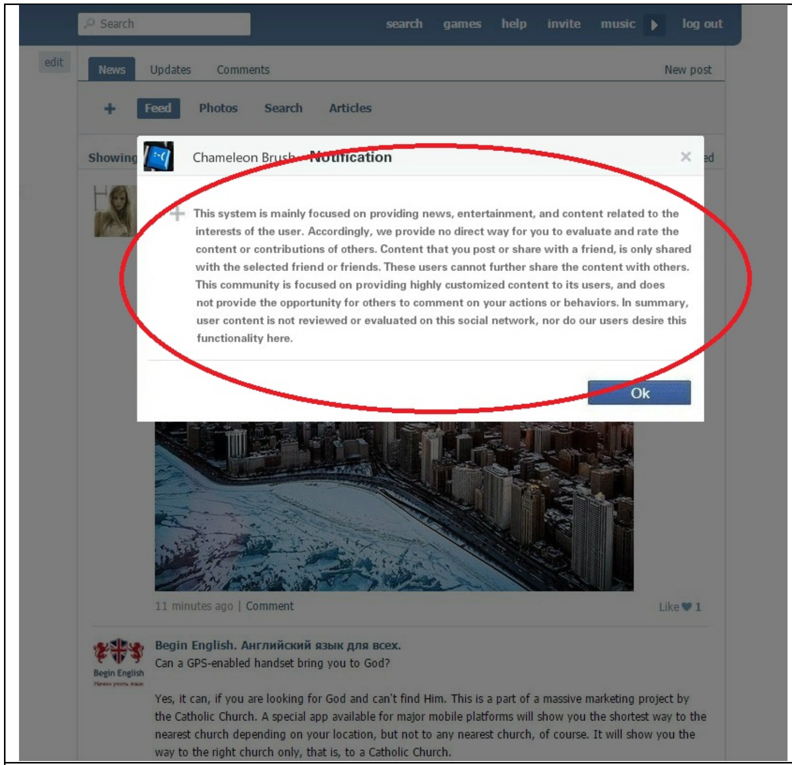
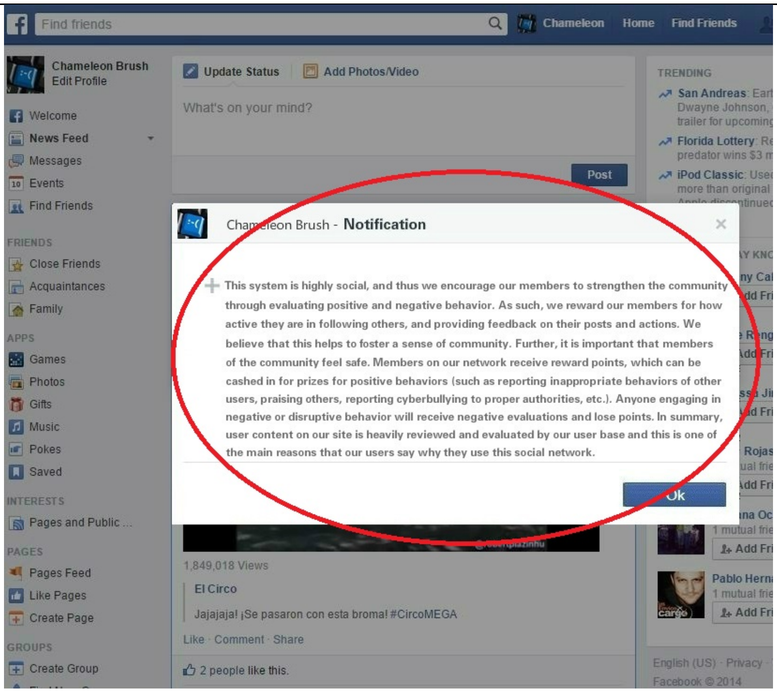
Avril Lavigne: Singer reveals struggle with undisclosed 'health issues' in

UConsent Meeting/Open Space
Friday at 4:00pm
Pc Warren Room in La Jolla, California
34 people are going

Michael Kayne Burdett
1 hr · San Diego, CA ·

It's all in your mind! No where else! Train your mind! You could have 10 hours of sleep and STILL be tired, why? Because you think that way. "Train your mind, and your body will follow."

Low social anonymity Facebook condition. High monitoring manipulation notification.

 Chameleon Brush - Notification This system is mainly focused on providing news, entertainment, and content related to the interests of the user. Accordingly, we provide no direct way for you to evaluate and rate the content or contributions of others. Content that you post or share with a friend, is only shared with the selected friend or friends. These users cannot further share the content with others. This community is focused on providing highly customized content to its users, and does not provide the opportunity for others to comment on your actions or behaviors. In summary, user content is not reviewed or evaluated on this social network, nor do our users desire this functionality here. Ok Begin English. Английский язык для всех. Can a GPS-enabled handset bring you to God? Yes, it can, if you are looking for God and can't find Him. This is a part of a massive marketing project by the Catholic Church. A special app available for major mobile platforms will show you the shortest way to the nearest church depending on your location, but not to any nearest church, of course. It will show you the way to the right church only, that is, to a Catholic Church.	 Chameleon Brush - Notification This system is highly social, and thus we encourage our members to strengthen the community through evaluating positive and negative behavior. As such, we reward our members for how active they are in following others, and providing feedback on their posts and actions. We believe that this helps to foster a sense of community. Further, it is important that members of the community feel safe. Members on our network receive reward points, which can be cashed in for prizes for positive behaviors (such as reporting inappropriate behaviors of other users, praising others, reporting cyberbullying to proper authorities, etc.). Anyone engaging in negative or disruptive behavior will receive negative evaluations and lose points. In summary, user content on our site is heavily reviewed and evaluated by our user base and this is one of the main reasons that our users say why they use this social network. Ok What's on your mind? El Circo Jajajaja! ¡Se pasaron con esta broma! #CircoMEGA 2 people like this.
Low social anonymity VK condition. Low evaluation awareness manipulation notification.	High social anonymity Facebook condition. High evaluation awareness manipulation notification.

Moreover, to manipulate for a high monitoring awareness, we used the following text:

> This system is highly monitored. Everything you do is recorded and monitored by the system and related personnel. As needed, authorized personnel can access system logs, which would allow them to review all messages, posts, likes, and social network activity from your account. Even deleted content would be traceable through these logs. In summary, anything and everything that you do on your account can be tracked and traced directly to you, now or in the future.

To manipulate for a low monitoring awareness, we used the following text:

> This system has no monitoring. No system logs are maintained, and the system was designed in such a way that no systems administrators are able to monitor the account in any way. The only people that are able to monitor your behaviors are your friends that you share messages, content, or posts with. Once you delete information or actions, it is permanently deleted and can never be recalled by anyone else. In summary, nothing you do on your account can be tracked or traced directly to you.

Evaluation awareness was also randomly assigned during each portion of the study by means of text that further grounded this contextual condition of the social networking sites policies and culture. To manipulate high evaluation awareness, we used the following text:

> This system is highly social, and thus we encourage our members to strengthen the community through evaluating positive and negative behavior. As such, we reward our members for how active they are in following others, and providing feedback on their posts and actions. We believe that this helps to foster a sense of community. Further, it is important that members of the community feel safe. Members on our network receive reward points, which can be cashed in for prizes for positive behaviors (such as reporting inappropriate behaviors of other users, praising others, reporting cyberbullying to proper authorities, etc.). Anyone engaging in negative or disruptive behavior will receive negative evaluations and lose points. In summary, user content on our site is heavily reviewed and evaluated by our user base and this is one of the main reasons that our users say why they use this social network.

To manipulate for a low evaluation awareness, we used the following text:

> This system is mainly focused on providing news, entertainment, and content related to the interests of the user. Accordingly, we provide no direct way for you to evaluate and rate the content or contributions of others. Content that you post or share with a friend, is only shared with the selected friend or friends. These users cannot further share the content with others. This community is focused on providing highly customized content to its users, and does not provide the opportunity for others to comment on your actions or behaviors. In summary, user content is not reviewed or evaluated on this social network, nor do our users desire this functionality here.

APPENDIX C. CYBERBULLYING SCENARIOS

Scenario	Riskiness	Subject response
Until recently, John was oblivious to a website that was anonymously created to publically harass and embarrass him. John has strong political views and he just learned from a shocked friend about the website and that it was likely motivated because of his views on abortion. Several anonymous people posted explicit, altered photographs of him, and have accused him of being a pedophile and that his family engages in incest. The website invited others to actively be involved in bashing him. The website has revealed public information that is true but that John had previously kept private, including his home address, his work address, incendiary political comments he has made about abortion, his salary, the names and birthdates of his kids, and his college transcripts. After investing this website further, after complaining to the Internet service provider, John discovers that indeed his long-time personal political enemy is the owner of the website.	High	In an act of retaliation, John creates a fake profile of his political enemy on the same social media system we just described to you. In doing so he posts altered pornographic pictures of his enemy and actively solicits for sex with minors under his enemy's name.
	Moderate	In an act of retaliation, John intentionally sends known viruses to his enemy's messaging 'inbox' on the same social media system we just described to you.
	Low	In an act of retaliation, John intentionally posts several negative messages on his enemy's homepage that we just described to you. He specifically calls him a liar and a manipulator.
John's best friend was a 20-year-old university sophomore who sent nude photos of herself to her boyfriend. Unfortunately, after they broke up her boyfriend decided to post the photos to a revenge porn site, including one in which they were engaging in a very deviant form of sex. Worse, an anonymous hacker sent the most explicit and embarrassing photo of her to all the faculty and students at the university. Hundreds of students, many of which did not know John's friend, continued to harass her through Facebook, Instagram, and text messages. John's friend eventually dropped out of college and hung herself, which was an extremely devastating loss to John and caused him to fall into depression. The next year, while John was still recovering emotionally from this traumatic experience, he encounters three classmates laughing about and viewing explicit photos of his dead friend on their smartphones.	High	As an act of revenge, John is so angry that he logs into the same social media system we just described to you and he uses explicit profanity to call them out on their actions and accuses them of having sexually assaulted his friend before she died.
	Moderate	As an act of revenge, John is so angry that he logs into the same social media system we just described to you and he logs onto the three students' homepages and claims the three are having sex together.
	Low	As an act of revenge, he logs into the same social media system we just described to you and he floods the messaging inboxes of the three students with thousands of spam messages.
John has a young daughter who has struggled with her self-image and weight throughout her early teen years. There is nothing wrong with her actual weight and appearance, but she is convinced she's fat and that she is not very smart. It hasn't helped that in the three years they have lived in their Atlanta neighborhood the other girls in the neighborhood have shunned and teased her because of her ethnicity and religion. Their mean behavior has gotten worse at school. She feels like she doesn't belong and has lately been acting very depressed, and doesn't want to go to school. The last straw for John occurs when he witnesses the neighborhood ring leader of the mean girls tell his daughter that she's fat and ugly, and should just kill herself. John is very angry at the lead mean girl and wants to break her legs. Instead, he logs into the social media system we just described to you, and decides to engage in an act of revenge.	High	To do so, he creates an altered, sexually explicit photo of the mean girl and posts it on the mean girl's account and those of her family and closest friends.
	Moderate	He creates a fake account pretending to be a sexy teenage male model who is in love with the girl. He pretends to be in love with her and to have a relationship with her for several days, only to dump her meanly and cruelly—calling her a fat, ugly, worthless whore.
	Low	To do so, he posts all kinds of profanity and insults at the lead mean girl and warns her to leave his daughter alone 'or else.'

When some students at a university stole John’s belongings, and he reported it to university authorities. Later that night, John received instant messages calling him vulgar and crude names and saying that he is a tattletale. Trying to defend himself, John replied that they had stolen his stuff, and that response just made it worse. When going out with his family, John’s Internet messages were forwarded to his phone and he had received the maximum limit, 50, which were all threatening, very mean messages, which threatened John with bodily harm, continued abuse, and further insults. The students never even said another word to John in person. Given the lack of face-to-face interaction with the students, and their continued harassment, John decides to retaliate against them.	High	John takes coverts pictures of the students at their homes and photoshops them into pornographic orgies involving only other men and horses. He sends the altered, explicit photos to all students at the school, excepting the ones in the photos via the social networking site.
	Moderate	John starts a rumor by sending messages to known gossipers at the university that two of the students are secretly sleeping with teachers and that is why they are receiving such good grades in their classes. He starts a rumor regarding the third student that he lost his virginity to his cousin when he was thirteen.
	Low	John creates several fictitious accounts and begins to post a number of obscenities and vulgarities on each of the students’ home pages.
John discovered that a bully at his college, Donald, has been using a GPS tracking device on his cell phone to stalk him. Donald purchased a Nextel phone device that has a motion switch on it that turns itself on when it moves, and attached it to John’s car. As long as the device was on, it transmitted a signal every minute to the GPS satellite, which in turn sent the location information to a computer. Donald planted the phone underneath John’s car, paid for a service to send Donald the information and would log on to a website to monitor John’s location. Donald would suddenly ‘bump’ into John at the coffee shop, bookstore, library, and even the local cemetery. John knew something was up, as he was being harassed at the college and all over town on a daily basis — Donald was also posting embarrassing photos of John around town and altering the information to slander John — but police couldn’t help him, as they claimed no law was technically broken as all of the photos were of John in public places. After he called the police, he noticed the phone attached to his car and understood how Donald had been able to follow him around town.	High	John uses Donald’s profile information to subscribe him into a sexaholics anonymous / pedophile’s anonymous organization for recovering convicted pedophiles, and creates a new profile on the social networking site that impersonates Donald. He invites all of Donald’s friend to friend this new profile and explains that he no longer wants to live a lie and that Donald would rather be open and honest about his addictions to sleep with anyone that is willing, but more especially with boys around age 10 or 11.
	Moderate	John takes the cell phone to a gay bar and waits with a camera to get real photos of Donald at the gay bar (Donald is an openly known homophobe on campus). John takes the cell phone to a gay bar and waits with a camera to get real photos of Donald at the gay bar (Donald is a known homophobic man on campus). He pays a few drunk guys to go and dance with Donald in a scandalous manner and make out with him. He gets many usable photos. He posts them on Donald's hoe page, and puts them in comment threads of all Donald's closest friends. He proceeds to "out" Donald and provides proof that the photos have not been altered, but that the legitimately display Donald acting out his urges at a gay bar.
	Low	John takes photos of the cell phone hidden under his car and posts it on Donald’s wall and explains that Donald

		has been tracking him around town by means of this cell phone. He warns that Donald is doing this to at least five other people and urges all of Donald’s contacts to check their own vehicles and be very wary of Donald.

ONLINE APPENDIX C: SUPPORT FOR METHODS AND ANALYSES

C.1 More about the FSM

FSM gives us the opportunity to simultaneously manipulate a large number of factors using a contextualized vignette, where the variations of the vignette are different levels of manipulations of the exogenous variables [6]. In our case, the vignettes consist not only of text, but also other social media cues presented before the subject. The implementation of the manipulations is randomized. Essentially, FSM allows researchers to investigate the informational elements used by the subjects to decide/respond to the survey questions, and how different individuals respond varyingly to the same information (text or visual) cues [14, p. 514]. It is also notable that FSM is particularly useful for capturing unethical, antisocial, or deviant behavior, as often capturing these behaviors in real life may pose legal and other challenges [11].

As explained in [12], the FSM has effective, unique properties that allow it to leverage the strengths of both surveys and experiments, and it allows for the testing of a large number of manipulations without suffering from otherwise expected multicollinearity problems. The effectiveness of this approach first involves eliminating the multicollinearity that would almost certainly appear when examining many factors with traditional surveys [8]. The FSM also supports the design and testing of a large number of factors—more than are possible with experimentation. Running a similar number of factors using experimental methodologies becomes impractically complex and requires too many subjects [8]. With FSM, the combination of random sampling with orthogonality helps eliminate multicollinearity, which allows for the testing of literally millions of combinations with reasonable numbers of participating subjects [4, 12]. Consequently, in sociological studies, it is considered the "methodological gold standard" for assessing normative judgments and ethical beliefs [9, p. 931] because it has been consistently established to very effectively "uncover the social and individual structures of human judgments of social objects" [14, p. 505]. By combining the analysis of huge numbers of combinations with vignettes that have contextual details, this method provides experimental control with a level of realism in the ethical and decision-making details that is simply not possible to accomplish under any other method [12, 14].

FSM gives us the opportunity to simultaneously manipulate a large number of factors using a contextualized vignette, in which the variations of the vignette are different levels of manipulations of the exogenous variables [6]. In our case, the vignettes consist not only of text, but also other social media cues presented before the subject. The implementation of the manipulations are randomized. Essentially, FSM allows researchers to investigate the informational elements used by the subjects to decide/respond to the survey questions, and how different individuals respond varyingly to the same information (text or visual) cues [14, p. 514]. It is also notable that FSM is particularly useful for capturing unethical, antisocial, or deviant behavior, as often capturing these behaviors in real life may pose legal and other challenges [11].

Previously, this method was conducted with textual vignettes; however, but Vance et al. demonstrated that it works with IT design artifacts. They also showed that the power of its orthogonality and lack of multicollinearity allows researchers to clearly distinguish between the specific effects of individual user-interface design-artifact manipulations, which is comparable to a "holy grail" in this line of research because it better allows for "evidence-based design science of IT artifacts" that maximizes experimental control and contextual realism [12, p. 353]. We thus followed their approach.

C.2 Factorial Manipulations

Following [12], we used a combination of graphical and textual treatments with hypothetical CB vignettes to fully maximize the use of the factorial survey method. Social anonymity was manipulated through the design of the interface pages of the social network (see Appendix B). To manipulate perceptions of identifiability, we again followed the definition and operationalization of two key sub-constructs:

knowledge of others and diffused responsibility [5]. Specifically, for *low* identifiability, we assured the participants that no identifying information was viewable on any social network page. The profile was attached to an avatar image and a fictitious name, and there was no way to contact the individual beyond an email address, which appeared to be of randomized characters. On subsequent pages, our manipulations made clear that all messages and posts could be made to other accounts anonymously, thereby limiting the ability of others to verify the origin of content.

For *high* identifiability, highly identifying information was provided. On the profile page, an image of an actual person was provided along with a name, address, phone number, an email with contextual information, and knowable networks. This approach was similar to the method of providing identifiability via design artifacts in [12]. Consequently, it would be easy for an individual to find and identify the person in the profile. On the subsequent pages, our manipulations made it clear that messages and posts could only be sent to known and verified friends and that these friends would be able to view and trace this information back to the known profile.

Monitoring awareness was manipulated through a notification that was used to further establish the contextual conditions of the social networking site, and this was also randomly assigned to subjects for each portion of the study. In addition, evaluation awareness was randomly assigned during each portion of the study by means of text that further established this contextual condition of the social networking site's policies and culture. The riskiness of the vignette's main character's CB behavior was also randomly assigned to assess the nomological validation of CBT to a potential non-criminal behavior.

C.3 Three Pilot Studies

Three pilot studies were used to contextualize, improve, and validate the manipulations and instrumentation used in this study. Moreover, these studies were used to discover the appropriate amount of time for each subject to complete the study and to determine effective attention traps to help prevent mono-method bias. The second of two pilot studies were used to determine the best method for recruiting the right subjects on Amazon's mTurk and how to best use it. Further details are available upon request. The first pilot study involved 85 students from four different IS courses at a university in the Western US. Students were provided extra credit for their participation in the study. The second pilot study consisted of 114 adult subjects who were gathered by means of recruitment via Amazon's MTurk for a small fee for each subject. The third pilot study consisted of 251 adult subjects who were also recruited by MTurk for a small fee.

C.4 Manipulation Checks

Prior to the analysis, we first determined the effectiveness of the manipulations. We reviewed each manipulation check in turn. To check whether our social anonymity manipulation successfully changed the perceptions of social anonymity, we compared and tested the differences of the means of all anonymity constructs and social presence awareness as defined by groups of high social anonymity and low social anonymity. The construct statistics and the results of the comparison of means are summarized in Table C.1, indicating successful anonymity manipulation.

Table C.1. Comparison of Social Anonymity Constructs by Social Anonymity Manipulation

	No Social Anonymity		**Social Anonymity**		**Results**	
Variable	**Mean**	**SD**	**Mean**	**SD**	***t***	***p***
Identifiability: knowledge of others	-.298	1.072	.301	1.051	-11.25	.000
Identifiability: diffused responsibility	-.287	1.146	.291	1.098	-10.27	.000
Social presence awareness	.306	1.094	-.327	1.305	10.49	.000

Note: All values in this table were standardized to more easily depict the differences in the means

To check the monitoring manipulation, we compared the means between the high and low monitoring conditions for the awareness construct (again, we used standardized values for this). Our manipulation was successful, with the high manipulation condition averaging 0.878 (SD = 1.205) and the low manipulation condition averaging -0.920 (SD = 1.788). The means comparisons test was significant (*t* = 23.657, *p* = 0.000). Likewise, to check evaluation awareness, we performed the same test. The high treatment condition (average = 0.439, SD = 1.023) was significantly different (*t* = 10.013, *p* = 0.000) from the low condition (average = -0.489, SD = 1.173). This indicates that we successfully manipulated evaluation awareness. Finally, to further ensure that all of our manipulations were significant, we ran MANOVAs for each of the above tests, and each was significant at *p* = 0.000.

Table C.2. Measurement Model Statistics

Constructs	**Mean**	**SD**	**1**	**2**	**3**	**5**	**6**	**7**	**9**	**10**	**11**	**14**
1. Control imbalance ratio	5.52	2.29	.209	.097	**.948**							
2. CB intention	1.29	1.19	-.050	.234	.225	**.948**						
3. Knowledge others	2.39	1.19	-.607	.264	-.056	.245	**.823**					
4. Denial responsibility	2.42	1.19	-.573	.278	.094	.278	.798	**.818**				
5. Social presence	4.46	1.16	.412	-.152	.312	.109	-.127	-.080	**.902**			
6. Evaluation	3.50	1.18	.731	-.041	.211	-.061	-.549	-.515	.374	**.870**		
7. Monitoring	4.49	2.20	.679	.128	.098	-.045	-.443	-.425	.122	.606	**.919**	
8. Resentment	4.47	1.19	-.013	.076	.092	.099	.109	.123	.056	.025	.030	**.898**

Note: Average variance extracted squared is depicted in the bolded number on the diagonal.

C.5 Post-hoc Analysis

Our post-hoc analysis is summarized in both Figure C.1 and Table C.3.

Figure C.1. Post-hoc Testing

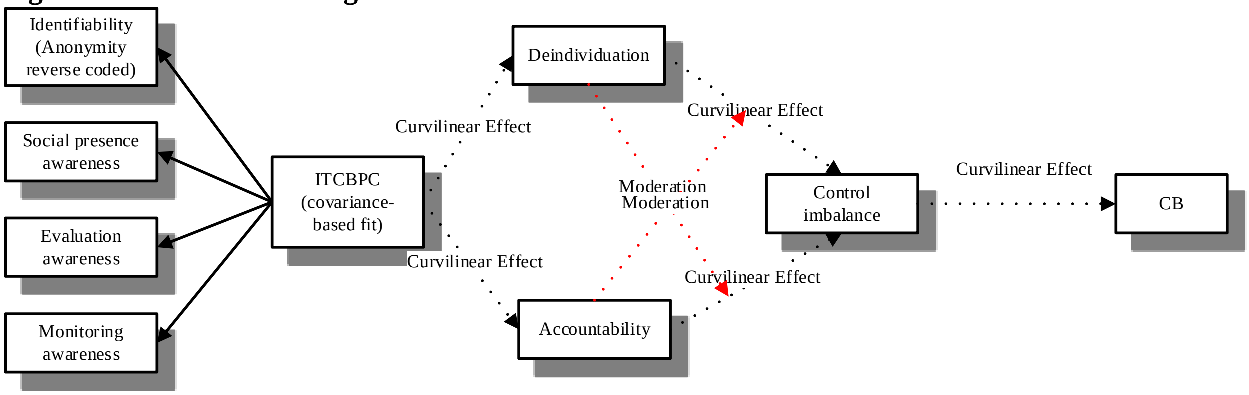


Table C.3. Post-hoc Analyses Results

CBR < 1					
Relationship	***b***	***SE***	***t***	***p***	***Significant***
IT capability → Deindividuation	-.253	.031	-8.28	.000	Yes
IT capability → Perceived Accountability	.551	.022	24.65	.000	Yes
IT capability^2 → Deindividuation	-.159	.030	-2.98	.003	Yes
IT capability^2 → Perceived Accountability	-.113	.022	-2.47	.014	Yes
Deindividuation → Control Balance	-.265	.052	-2.32	.021	Yes
Perceived Accountability → Control Balance	.312	.064	3.34	.001	Yes
Deindividuation^2 → Control Balance	.137	.038	2.95	.003	Yes
Perceived Accountability^2 → Control Balance	-.163	.044	-2.45	.015	Yes
Deindividuation moderates: Perceived Accountability^2 → Control Balance	.159	.049	2.20	.028	Yes
Perceived Accountability moderates: Deindividuation^2 → Control Balance	.164	.054	2.16	.031	Yes
Control imbalance R^2 = .265 Deindividuation R^2 = .267	Intention R^2 = .290 Perceived Accountability R^2 = .303				
CBR > 1					
Relationship	***b***	***SE***	***t***	***p***	***Significant***
IT capability → Deindividuation	-.267	.102	-2.63	.009	Yes
IT capability → Perceived Accountability	.697	.060	11.71	.000	Yes
IT capability^2 → Deindividuation	-.119	.103	-1.09	.276	No
IT capability^2 → Perceived Accountability	.165	.068	2.17	.030	Yes
Deindividuation → Control Balance	-.219	.106	-2.18	.029	Yes
Perceived Accountability → Control Balance	.324	.163	2.76	.006	Yes
Deindividuation^2 → Control Balance	.129	.039	3.29	.001	Yes
Perceived Accountability^2 → Control Balance	.141	.032	3.31	.001	Yes
Deindividuation moderates: Perceived Accountability^2 → Control Balance	.228	.111	1.98	.048	Yes
Perceived Accountability moderates: Deindividuation^2 → Control Balance	.229	.072	2.88	.004	Yes
Control imbalance R^2 = .288 Deindividuation R^2 = .172	Intention R^2 = .249 Perceived Accountability R^2 = .486				

REFERENCES OF APPENDICES

1. Cyr, D; Head, M; Larios, H; and Pan, B. Exploring human images in website design: a multi-method approach. *MIS Quarterly*, 33, 3 (2009), 539-566.
2. Hekman, DR; Steensma, HK; Bigley, GA; and Hereford, JF. Effects of organizational and professional identification on the relationship between administrators' social influence and professional employees' adoption of new work behavior. *Journal of Applied Psychology*, 94, 5 (2009), 1325.
3. Hu, Q; Xu, Z; Dinev, T; and Ling, H. Does deterrence work in reducing information security policy abuse by employees? *Communications of the ACM*, 54, 6 (2011), 54-60.
4. Jasso, G. Factorial survey methods for studying beliefs and judgments. *Sociological Methods & Research*, 34, 3 (2006), 334-423.
5. Lowry, PB; Moody, GD; Galletta, DF; and Vance, A. The drivers in the use of online whistle-blowing reporting systems. *Journal of Management Information Systems*, 30, 1 (2013), 153-190.
6. Martin, KE. Diminished or just different? A factorial vignette study of privacy as a social contract. *Journal of Business Ethics*, 111, 4 (2012), 519-539.
7. Piquero, AR; MacIntosh, R; and Hickman, M. Applying Rasch modeling to the validity of a control balance scale. *Journal of Criminal Justice*, 29, 6 (2001), 493-505.

8. Rossi, PH and Anderson, AB. The factorial survey approach: An introduction. In P.H. Rossi, and S. Nock (eds.), *Measuring Social Judgments: The Factorial Survey Approach*. Beverly Hills, CA: Sage, 1982, pp. 15-67.
9. Seron, C; Pereira, J; and Kovath, J. How citizens assess just punishment for poilce misconduct. *Criminology*, 44, 4 (2006), 925-960.
10. Shalley, CE. Effects of coaction, expected evaluation, and goal setting on creativity and productivity. *Academy of Management Journal*, 38, 2 (1995), 483-503.
11. Siponen, M and Vance, A. Neutralization: new insights into the problem of employee systems security policy violations. *MIS Quarterly*, 34, 3 (2010), 487-502.
12. Vance, A; Lowry, PB; and Eggett, DL. A new approach to the problem of access policy violations: Increasing perceptions of accountability through the user interface. *MIS Quarterly*, 39, 2 (2015), 345–366.
13. Velicer, WF; Govia, JM; Cherico, NP; and Corriveau, DP. Item format and the structure of the buss-durkee hostility inventory. *Aggressive Behavior*, 11, 1 (1985), 65-82.
14. Wallander, L. 25 years of factorial surveys in sociology: A review. *Social Science Research*, 38, 3 (2009), 505-520.