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PREVENTING THE NEXT SEXT: A BEHAVIORAL ECONOMIC APPROACH TO  
UNDERSTANDING NON-CONSENSUAL NUDE PHOTO SHARING DECISIONS IN A  
HIGH SCHOOL COMMUNITY

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A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of School Psychology in the School of Education.

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## ABSTRACT

Katherine Ingram: Preventing the next sext: A behavioral economic approach to understanding non-consensual nude photo sharing decisions in a high school community (Under the direction of Dorothy Espelage, PhD)

Sexting refers to the sending or receiving of sexually explicit or suggestive images or video via any cyber platform (Hinduja & Patchin, 2012). Adolescents sext at alarming rates: Between 12-27% report involvement as a recipient or participant (Madigan et al., 2018). Many students are faced with the decision to forward a sext or not. This phenomenon holds numerous irreparable consequences for students, as distributing child pornography is a criminal offense. However, prevention strategies are a-theoretical and measurement is insufficient. The current study sought to understand the behavioral mechanisms that underlie sexting and provide a behavioral measurement of sexting risk using a behavioral economic framework. Subjects: A sample of 213 high school students were recruited from a Chicago-area high school. Partnerships: Peagram Consulting, an organization that provides in-school bullying prevention curricula facilitated participant recruitment. Research Design and Methods: All aims were addressed using cross-sectional quantitative and qualitative data. Analysis: Aim 1. Examined current real-world sexting prevalence rates, types, and context characteristics by utilizing survey methods that yield in-depth quantitative and qualitative data. Sample descriptive statistics for each variable were inspected and visualized. Grounded theory was used to analyze qualitative data and create a ground-up conceptual model of non-consensual sexting. Results separated the ways photos originate from the ways in which they're forwarded non-consensually, and showed that most of the sample had received a sext in the last year. Most students see nude images on multiple platforms. Aim 2. Using an adaptation of the established Social Discounting Task, this aim examined social discounting of preferential and popular peers as predictors of real-world self-reported sexting behavior. For each, a receiving operator curve (ROC) analysis was used to

examine the accuracy of social discounting rate  $S$  (yielded by the social discounting task) in predicting whether or not a student has reported forwarding sexts in the past. Qualitative data provide context regarding gender and participant individual differences. Social discounting across the preference axis predicted sexting behavior significantly better than change, results were mixed regarding the popularity discounting. Aim 3. Test a novel Sext Discounting Task to capture hypothetical sexting choices. To examine systematicity of data yielded, all discounting data was assessed for orderliness and cleaned according to guidelines by Johnson and Bruner (2008), and was fairly systematic throughout the sample. Within-individual correlations of sext discount rates with the original discounting task and real-world self-reported sexting measures was examined, and showed higher correlations among within- modality measures than within construct measures. A latent class analyses showed four profiles of sexting behavior where the largest class does not discount to a high degree, signaling altruistic behavior trends. Differences between the other three indicate a domain-general quality in social discounting, though identify sexting as a unique behavior. Choice tasks and social discounting theory hold promise for future work with other interpersonal processes.

## CHAPTER I: Introduction

*Sexting* refers to the sending or receiving of sexually explicit or suggestive images or video, called *sexts*, via a mobile device messaging or social media platform (Hinduja & Patchin, 2012). Adolescents sext at alarming rates, with between 12-27% reporting involvement as a recipient or participant (Madigan, Ly, Rash, Van Ouytsel, & Temple). Thus, many students, including students who were not intended recipients of the image, are faced with the decision of whether or not to forward the image and contribute to the contagion effect. This phenomenon holds numerous irreparable consequences for students, as distributing child pornography is a criminal offense at the federal level. Further, these images are often obtained by malicious third parties and are posted to child pornography hubs on the dark web. School-based sexting prevention efforts have been largely unsuccessful, and sexting rates have increased in recent years as technological devices and web-based social platforms have become ubiquitous among teens (Madigan et al., 2018). No study to date has examined mechanisms responsible for students choosing to forward a sext.

Social discounting (Jones & Rachlin, 2006) holds promise as a framework for exploring underpinnings of these choices. This theory posits that the extent to which individuals are willing to make an altruistic sacrifice for a person varies systematically as a function of perceived closeness to that person. This approach aligns with a small body of literature that suggests sexts can be conceptualized as “social currency” used to attain social status (Johansen, Pedersen, & Tjørnhøj-Thomsen, 2019; Maheaux et al., 2020). Humans engage in altruistic behavior, or selfless acts that incur a cost to the self and solely benefit another person. However, humans do not distribute their altruism equally among other humans. Social Discounting (Jones & Rachlin, 2006) posits that the amount of altruism an individual is willing to enact for another person

varies systematically as a function of perceived social distance: individuals sacrifice more for socially close individuals (e.g., a sibling, a best friend) and less for socially distant individuals (e.g., a colleague, a party acquaintance). Building on this concept, individuals differ on this trait: some people would give their paycheck to nearly anyone in need (demonstrating a very shallow discount rate across social distance), whereas other people would only be willing to give their paycheck to a family member in the same circumstance (demonstrating a very steep discount rate; a et al., 2014). This construct is supported by empirical literature and is valuable to understanding how individuals make social decisions (Sharp et al., 2012; Strang et al., 2017; Strombach et al., 2015). Despite ostensible relevance, this framework has never been extended to examine sexting behavior.

Further, the theory of Social Discounting will be extended by findings from the study of sociometrics. Broadly, sociometrics refers to the quantitative measure of social relationship quality, but in the current study will focus on two dimensions of peer relationships: preference and popularity (Lafontana & Cillessen, 1999; Terry & Coie, 1991). Preference, sometimes called “acceptability,” refers to how well-liked a peer is by others. Differently, popularity in this context refers to the amount of social power, prestige, or visibility an individual holds in a peer network (Cillessen & Marks, 2011). Several studies have documented the distinction between these constructs, and their associations with other individual characteristics. For many years, social preference was the only dimension used to measure sociometric social position, and the peer nomination method was created to assess preference of peers (and lack thereof; Coie et al., 1982). The concept of popularity or social impact emerged as a distinctly different concept from preference. Popularity often becomes highly important to adolescents, and they strive to achieve

and maintain it by conforming to behavioral norms athletic or academic achievement, engaging in romantic relationships, or prioritizing high-capital friendship (Lafontana & Cillessen, 2009).

Unfortunately, current prevention strategies are currently devoid of theoretical and evidence bases, and are not tailored to target the dynamics underpinning sexting behavior. The proposed study aims to fill a significant gap in the school safety literature by testing the relevance of social discounting and sociometric theories in understanding adolescent sexting behavior, as to inform measurement, intervention strategy, and evaluation in the future. It will do so by recruiting 400 high school students recruited from one community to complete laboratory analogs of sexting behavior and self-report surveys during one 45-minute data collection session. These behaviorally-obtained hypothetical choice data and self-reported real-world data will be leveraged to test a series of questions regarding sexting decisions, and the role of reward sensitivity to two types of peers: preferential (i.e., friends) and popular (i.e., influential in the peer network), culminating in an empirical understanding of the driving forces underlying sexting. These data allow for designing targeted, effective, sexting prevention strategies.

Specifically, the proposed work aims to:

- (1) Examine current real-world sexting prevalence rates, types, and context characteristics by utilizing survey methods that yield in-depth quantitative and qualitative data.
- (2) Examine individuals' (trait-level, commodity-general) rates of social discounting of preferential and popular peers as predictors of real-world self-reported sexting behavior. To do this, participants will complete lab analog behavioral choice tasks that assess their social discounting patterns (i.e., the extent to which they are willing make a hypothetical altruistic sacrifice for (a) peers they like and (b) peers they believe have social influence), indicated respectively by  $S_{preference}$  and  $S_{popularity}$ . Then, these data will be entered as

predictors in a multiple linear regression model where real world sexting data is the criterion variable.

- (3) Create and use a novel adaptation of the Social Discounting Task (Jones & Rachlin, 2006) to test whether or not sexting decisions are made *systematically* as a function of social distance and perceived popularity. Specifically, this aim will address the following questions: (3a) Do the participant's preference and popularity ratings of the peer pictured in a hypothetical sext *systematically* predict whether or not the participant would forward it? (3b) To what extent do scores obtained on this measure correlate with  $S_{preference}$  and  $S_{popularity}$  obtained on the original Social Discounting Task (used in Aim 2; Jones & Rachlin, 2006)?

Establishing a foundational, empirically supported, understanding of what drives sexting behavior is critical to developing effective interventions that will interrupt pathways to justice-system involvement for youth and aid in undermining the child pornography industry.

## CHAPTER II: Review of the Literature

### **Sexting: non-consensual nude photo sharing**

*Sexting*, defined as sending or receiving sexually explicit or suggestive images or video, is occurring at alarming rates among youth. According to a 2018 meta-analysis of 39 studies with 11,380 total participants, 14.8% reported sending a sext, 27.4% had received a sext, 12.0% had forwarded a sext without consent, and 8.4% reported being the subject of a sext that was forwarded without consent (Madigan et al., 2018). While sexts can originate as a consensual act of intimacy, among youth, sharing this photo often becomes a contagion where the sext is circulated around the entire community. In recent years, this contagion-like spread has become faster and wider, with the popularization of group message threads and various photo-sharing



platforms (Madigan et al., 2018). Even on photo sharing applications where users can only view images they receive for a limited amount of time (e.g., Snapchat), third party applications can extract such data and users can “screenshot” images they receive. Thus, many students, including students who were not intended recipients of the image, are faced with the decision to forward the image or not.

Sexting can be highly-consequential for all parties who engage. Legally, creating or distributing content featuring a minor that meets criteria for a “lascivious exhibition of the genitals or pubic area” is considered child pornography under 18 US Code §2255(2)(E). While several states have passed legislation specific to addressing adolescent sexting, creating and distributing child pornography as determined by the aforementioned statutory scheme (*Id.* at 830) remains a criminal offense at the federal level. Thus, students who have been found distributing such material are often tried as adults and thus face life-long legal repercussions, such as registration as a sex offender. Further, in *New York v. Ferber*, the Supreme Court concluded that child pornography is a form of child abuse, as it is a permanent record of the sexual exploitation of a child. Further, this phenomenon is not only emotionally, socially, and professionally harmful to students, but it also increases the likelihood that the photo will be obtained by a third-party data hacker or other adult with motives to upload the photo to child pornography hubs on the dark web (Martin, 2013).

Given their immature cognitive developmental stage (Dahl, 2004), adolescents may not be able to fully comprehend the far-reaching legal and other (e.g., professional, mental health) implications of sexting. The frontal lobe, which is the part of the brain responsible for self-regulation and risk-taking, is still developing during adolescence. For this reason, youth are highly sensitive to immediate reward, and willing to incur a high level of risk in service of

desirable rewards (Jensen & Nutt, 2015). Nonetheless, the smart phones that connect them to the most highly rewarding stimuli (e.g., friends, social media, games) can be also used to incur detrimental long-term consequences (e.g., sex offender registration, photos on the dark web). Thus, it is unsurprising that the current prevention strategies based simply on education about responsible use of devices is ineffective in changing behavior.

Legal classifications for sexting vary from misdemeanor to felony by state. In many states, sharing sexts is considered distributing child pornography, even if the distributors are minors themselves (Lorang, McNiel, & Binder, 2016). A 2013 study of 378 state prosecutors who worked on technology-related crimes against children found that 16% had sexting cases that resulted in a sentence requiring mandatory sex offender registration (Walsh, Wolak, & Finkelhor, 2013). Sixty-two percent of the sample had juveniles charged with felonies, a majority of which were child pornography related felonies (Walsh et al., 2013). In several states, youth over 15 years old have been tried as adults (Beitsch, 2017). These circumstances hamper students' professional and personal futures and burden the criminal justice system.

Perhaps even a more detrimental outcome of this practice is the gateway it creates for the further exploitation via the adult-facilitated child pornography industry. There are several pathways by which these images initially shared among adolescent peers are obtained by adults and replicated infinitely on online communities (Ringrose, Gill, Livingstone, & Harvey, 2012). Third parties are becoming increasingly savvy in their abilities to illegally extract data from servers or apps via hacking. Additionally, many adults with intentions to distribute child pornography have access or can get access to a child's cellular device or social media accounts. Thus, sharing sexts increases the chances of these far-reaching and highly damaging criminal offenses. Creating empirically informed prevention strategies is critical.

## **Sexting as a Goal-Directed Behavior and Social Discounting**

Drawing from the foundational work conducted by B. F. Skinner (1953), behaviorism offers a robust theoretical approach that may inform a productive approach to preventing sexting. Skinner (1953) defines behavior as a means to an end, maintained by gaining an attractive reward or avoidance of an undesirable consequence. In other words, people ultimately engage in behavior that somehow serves them. Taking this approach to prevent similar problem behaviors such as aggression (Roscoe, Kindle, & Pence, 2010) and sexual assault (Vollmer, Joslyn, Reyes, & Walker, 2019) have created a basis for successful crime reduction strategies.

No peer-reviewed quantitative work to my knowledge has formally extended this framework to sexting behavior. However, a small literature suggests sexts are used as “social currency,” and traded to gain social status in the peer network. For example, a qualitative Danish study concluded that sexts serve as “visual gossip,” and are forwarded as a way to solidify social bonds and place value on the individuals pictured (Johansen, Pedersen, & Tjørnhøj-Thomsen, 2019). Further, Maheux and colleagues (2020) found that 87% of a high school student sample (n = 600) believed that a typical popular student in their school had non-consensually shared at least one sext of someone else in the past year. These findings suggest that sending a sext marks the sender as someone with influence in the social network, thereby increasing their social capital.

On this basis, social discounting is an appropriate framework for testing the hypothesis that sexting functions as a means to gain social currency in the peer network. A social discounting approach allows one to examine (1) who is at-risk of engaging in sexting behavior generally and (2) how that risk is shaped by opportunities to maintain or gain status and hurt or protect peers. To model this construct quantitatively, an individual might assign a value to

perceived closeness with individuals in their life, ranging from 1 to 100. People in positions 1 through 5 may be one's immediate family members and people 90 through 100 may be mere neighborhood acquaintances. This value of closeness can be represented by the coefficient  $N$ , or perceived social distance. Then, the rate at which a person discounts social distance is calculated using the equation  $v = V/(1+sN)$ , where  $v$  is the discounted value of the reward (in this case, the subjective value of that social status increase),  $V$  is the undiscounted value of the reward,  $s$  is a constant measuring degree of social discounting and  $N$  is social distance (Jones & Rachlin, 2006). This phenomenon has been studied experimentally using paradigms where participants are instructed to choose between a large amount of money for themselves or a smaller amount split between themselves and another person of varying social distance. Money has historically been used in these experiments as it is easily quantifiable, systematically manipulatable, and universally valued (Ostaszewski & Osinski, 2011). However, several scholars have demonstrated that monetary values are ecologically valid proxy measures for capturing this generalized phenomenon that humans engage in using other demonstrations of altruism with specifically relevant goods (Jeuland, 2010; Vasilii, Locey, & Rachlin, 2013).

When a student receives a sext, the choice they face aligns with the choice paradigm presented in the Social Discounting Task described above (Jones & Rachlin, 2006). Choosing to forward a sext (and thus theoretically gain social status for oneself and damage social status of photo's subject) is analogous to the option to keep the large sum of money for oneself (and allocate none to the other person). Choosing not to forward the photo is analogous to choosing to split the sum evenly between oneself and the individual pictured in the photo. In this scenario, both the agent and the photo subject maintain their previous social standing (no one gains nor loses). Further, ample qualitative and quantitative psychological research suggests that sexual

violence crimes are often rooted in the perpetrator's dehumanization of the victim (Awasthi, 2017; Rudman & Mescher, 2012). When perpetrators perceive victims as humans with agency and internal qualities that they can relate to, behavior and views often shift such that they are no longer inclined to violently target that person (Tompkins, Shields, Hillman, & While, 2015). It therefore follows that social discounting rates would serve as an approximation of the percentage of people in a student's social network they would protect and sacrifice a status boost for by choosing not to forward a photo of that person.

Most of the social discounting literature has been conducted among adults and applied work has focused on highly clinical issues such as substance use (e.g., Yi et al., 2012), with two notable exceptions. First, Sharp and colleagues (2012) found that adolescent boys who scored in the clinical range on indices of externalizing behavior issues exhibited steeper social discounting curves compared to peers with less severe externalizing problem behavior. The sample included 170 boys ages 8 through 17, recruited through community organizations in Houston, Texas. This finding is important for several reasons. First, it establishes validity of the discounting task among youth. Given the need to think somewhat abstractly and utilize working memory, it was previously unclear if the task designed for adults would be acceptable for use with youth. Additionally, this study was the first to find evidence for systematicity in prosocial decisions among youth. Of note, age was correlated with un-systematic responding such that younger, pre-adolescent participants were more likely to evidence a pattern in who they hypothetically behaved altruistically toward. However, older participants appeared to reliably yield a pattern similar to adults would. Finally, it offers support for the social discounting task as a potentially meaningful index of propensity to engage in anti-social behavior. One other study uses social discounting to understand peer interaction. Using a sample of undergraduate students, Hayashi

and Tahmasbi (2020) developed a novel social discounting task where participants were presented with cyberbullying scenarios, and made a series of choices regarding helping the victim as a bystander as social distance from the victim was titrated. As expected, they found that the likelihood of helping the victim decreased as a function of social distance to the victim. Interestingly, participants were more likely to help the victim if they had a history of helping victims, which raises questions about how that behavior may have been reinforced internally and/or externally. Further, the group that would readily help the victim scored significantly higher than the group that reportedly would not help on measures of empathy and intention in a simple means comparison. This finding offers support in the form of convergent validity to the primary analysis.

### **Sociometric Preference and Popularity**

Based on research in peer sociometrics (i.e., the quantitative measure of social relationship quality), the current study will examine how students discount across dimensions of both preference and popularity. Researchers find that perceptions of peer preference (i.e., closeness, who one's friends are) and popularity (i.e., who one perceives to have social influence in the peer network) represent separable dimensions in influential peer relationships (Cillessen & Rose, 2005; Coie, Dodge, & Coppotelli, 1982). Whereas being ranked as highly preferential in a peer network is consistently associated with patterns of prosocial behavior, being ranked as popular is consistently associated with relational and overt aggression among adolescents (Lansu & Cillessen, 2012; Peters, Cillessen, Riksen-Walraven, & Haselager, 2010).

When youth have been asked to describe the essence of popularity, themes of social connectedness, prominence, visibility, and physical attractiveness have emerged (Closson, 2009; Xie, Boucher, Hutchins, & Cairns, 2006). Therefore, it appears to be a relevant driver of social

behavior. Obviously, preference and popularity domains interact: Vallaincourt (2001) found that students who were “controversial” on the preference domain (i.e., strongly liked by some, strongly disliked by others) reliably scored highest on the popularity domain. Whereas being ranked as highly preferential in a peer network is consistently associated with patterns of prosocial behavior, being ranked as popular is consistently associated with relational and overt aggression among adolescents (Lansu & Cillessen, 2012; Peters et al., 2010). Thus, both domains together shape how students interact with one another, including prosocial and antisocial behavior.

If the path to becoming popular and influential requires taking social currency from individuals who currently have it, forwarding sexts (especially if they feature popular individuals) seems like an adaptive way to accomplish this goal. However, what if that valuable sext features a close friend? Perhaps an adolescent would forego the social status boost of sending it around to protect their friend. This scenario demonstrates the proposed model that perceptions of preference and popularity regarding a peer featured in a sext together predict how likely that individual would be to forward it to others. However, given that individuals have varying trait-level capacities for altruism and social dominance, how two individuals behave toward (for example) their own #4 person on the preference dimension may look very different. As such, it is important to take discount rates into account. Thus, the current study will examine rates at which individuals socially discount across dimensions of preference (i.e., closeness) and popularity (i.e., social influence).

### **Insufficient measurement of sexting behavior and risk of sexting**

Measurement of risk is insufficient, and behavioral measurement tools that account for social context of sexting have not been explored. Measurement techniques used in sexting

literature have relied on self-report data that are limited in scope. This method overlooks the importance of context surrounding prevalence rates and biases of self-reports, and provides no way of knowing how likely a student is to forward a sext if the opportunity has not yet arisen. Studies on sexting have been limited to surveys that inquire about how many sexts students report they have sent or received in specified time frame (Hinjuda & Patchin, 2012; Madigan et al., 2018; Van Ouystel et al., 2018). These data are insufficient to inform effective intervention for two reasons. First, it carries inherent biases that threaten internal validity of the data. These include social desirability (i.e., the tendency to report on oneself in a more favorable way than is true; Grimm, 2010), fear of disciplinary action, and memory inconsistencies. Thus, methods that address the aforementioned biases are needed to build upon the existing knowledge base. Second, these data lack sufficient depth of context to provide insight into the process that underlies a student deciding whether or not to forward a sext. In-depth understanding of the rewards or functions and the conditions leading to individuals forwarding a sext would allow interventions to interrupt the behavior-reward association of these actions. Accordingly, the implications for informing prevention are limited, given that one must have had the opportunity to sext and seized it to be counted. These data provide no way to assess risk.

### **Study Rationale**

The current study responds to Van Ouystel and colleagues' (2018) call for varied methods to address current measurement limitations in sexting research by employing quantitative and qualitative questions about the function of sexts and behavioral analog tasks. The self-reported questions ask students about what they perceive to be the motives behind sexting, and about core context features such as directness and size of the group chat in which it was shared, offering important insight beyond prevalence rates. Further, the current study aims to



validate social discounting to understanding risk propensity differences based on who the victim of the sext is. Rate of social discounting is measured by a series of hypothetical choices the participant makes where they must choose between a reward kept for oneself or splitting a reward between oneself and another individual, at varying social distances. This behavioral measure is less subject to social desirability forces, compared to reflecting on one's own previous potentially desirable past actions. Additionally, the two dimensions of peer relationships, popularity and preference, allow for further testing of friendship and social dominance as reinforcers of the behavior. Further, social discounting rates do not require a student to have had to sext before self-reporting on the behavior. Risk can be assessed prior to an incident taking place, which holds numerous practical applications for working with individuals and school systems. Finally, social discount rates can provide somewhat specific insight into differential effectiveness of interventions, because the values yielded remain standardized across applications. This quantifiable difference between effectiveness scores is also practically meaningful, compared to self-report scales where a relative comparison is the best available metric.

### **Research questions and hypotheses:**

**Aim 1. Examine current real-world sexting prevalence rates, types, and context characteristics by utilizing survey methods that yield in-depth quantitative and qualitative data.** First, this aim intended to describe the participants and sample, as to contextualize findings. There is no prior evidence that demographic characteristics meaningfully predict involvement in sexting. Nascent extant literature suggests that students who are popular, in that they are highly socially influential in the peer network, will be more likely to have engaged in sext-forwarding. Second, this aim reports on participants' involvement in sexting based on

quantitative data collected on the number of sexts they've received in the past year, number (of those received) forwarded in the past year, whether or not they have originated images of themselves, platforms utilized for sexting over the last year, and the characteristics of the most recent sext they received: whether or not they forwarded it, closeness rating of the victim, popularity rating of the victim, specific identifiers (e.g., previous romantic interest, best friend, etc). These data, in connection with demographic characteristics, were visualized using an interactive interface on Tableau, as to assess for patterns that may be missed with variable-centered descriptive analyses. Finally, participants' qualitative data in response to open-ended questions about the contexts around how they experience sexting, and their perceptions of motivation was analyzed and visually modeled using Evolved Grounded Theory.

**Aim 2. Examine social discounting of preferential and popular peers as a predictors of real-world self-reported sexting behavior.** This aim examined rates of discounting across preference and popularity dimensions of peer relations.  $S_{preference}$  and  $S_{popularity}$  respectively were calculated for each participant, and used as a predictor in a series of ROC models where the outcomes were self-reported past sexting behavior and their “decisions” in response to hypothetical scenarios. Participants with lower  $S_{popularity}$  and higher  $S_{preference}$  values were expected to be least likely to have forwarded peers' sexts non-consensually compared to peers in the sample. Additionally, to better understand student perceptions of the constructs that the discounting measures are capturing, qualitative findings related to participants' reflections on preference, popularity, and other qualities related to the individual in the photo of sexts they have or may receive.

**Aim 3. Examine the utility of a novel sexting-specific discounting task compared to the domain-general Social Discounting task.**

This aim included the creation of a novel task, adapted from the social discounting task though specifically intended to assess hypothetical sexting decisions in a face-valid, somewhat more ecologically valid, behavioral choice paradigm. This aim builds on findings from Aim 2 by assessing within-individual comparisons of their rates of discounting across peer relationship axes (preference, popularity) and tasks (social discounting domain-general task, sexting-specific task). Correlations among measures were inspected, and a Latent Profile Analysis was used to explore trends in how the four measures interrelate within individuals. Indicator means, demographic and behavioral characteristics of each class were assessed.

**Aim 4. Exploratory: What novel insights do qualitative reports yield about sexting context, perceptions, or beliefs beyond a-priori aims?** This aim names the study's commitment to the Evolved Grounded Theory analysis, and as such, acknowledges that themes may emerge that add substantial value though could not have been anticipated by the research team.

### **CHAPTER III: Methods**

This study involved two phases of research. First, a brief pilot study involving five participants was conducted to test initial feasibility and receive acceptability feedback on the study instrument. Second, the primary study involved recruiting 213 participants to test the study aims using the instruments modified based on the pilot study and consulting with content area experts. Participants and procedures are described separately for each phase. All study procedures were approved by the University of North Carolina Institutional Review Board (IRB).

#### **Participants**

All participants were high school students ages 14 through 18 years old. For both the pilot study and the primary study, a waiver of active consent was secured from the University of North Carolina at Chapel Hill IRB in favor of a passive consent process for participants under 18 years of age. Parents were provided an informational letter about the study, including directions on how to opt their child out of participating by returning a hard copy of the letter or emailing the principal investigator if they should so choose. Parents were also invited to ask the principal investigator any questions they had regarding participation. Upon participation, students were engaged in assent process that included an overview of what the study would involve, risks and benefits, compensation, and the affirmation of the choice to end participation without any penalty.

### ***Pilot study***

Data were collected from 5 high school students recruited via the UNC Research for Me platform, which facilitates connecting community members with research studies at UNC seeking their participation. Twelve eligible participants expressed initial interest in the posting, however only 5 completed consent/assent, resulting in a recruitment rate of 42%. The informational letter and opt-out directions were sent to parents via this platform. No parents opted-out of the pilot study on behalf of their child. Participant assent forms were presented with the first iteration of the primary study, and then asked to answer questions following completion regarding reactions to the content (including thoughts on any aspects of sexting that felt important to address in the study based on their experience), ease of user experience, and any other reactions they had. Participants were compensated with a \$10 Amazon gift card upon participation.

### *Primary study*

Cross-sectional data were collected from 213 high school students recruited from a racially and ethnically diverse high school in the greater Chicago area. Peagram Consulting, an organization that provides in-school social-emotional learning prevention curricula in the school community served as a community partner to assist with participant recruitment, participant engagement, interpreting analyses, and dissemination. All procedures were consistent with the school partner's protocols, and approved by the school's administration personnel. The study was advertised via flyers, announcements, word of mouth, and the research team being present during non-academic activities that included down-time (e.g., scheduling days for the next semester, where students are assigned to wait in the auditorium during a specific period until called to meet with a counselor). Data collection was facilitated by the PI, community partner, and an undergraduate research assistant during non-instructional times. As described previously, a waiver of active consent was secured from the University of North Carolina at Chapel Hill Institutional Review Board in favor of a passive consent process. Parents were provided an informational letter about the study, including directions on how to opt their child out of participating by returning a hard copy of the letter or emailing the principal investigator if they should so choose. Parents were also invited to ask the principal investigator any questions they had regarding participation. Two parents returned the letter to opt-out on behalf of their children. Upon participation, students were engaged in an assent process that included an overview of what participation in this study would involve, risks and benefits, compensation, and a reminder of their option to end participation without any penalty at any time. Participants were compensated with a \$5 Amazon gift card upon completing the first half of the study and another

\$5 Amazon gift card upon completing the second half. All participants completed both parts of the study, so all participants were compensated \$10 total in Amazon gift cards.

## **Procedures**

### ***Pilot study***

The pilot study was conducted to test the feasibility of the survey instrument created. Participants were provided with the initial version of the study survey, and participation was facilitated live in-person on campus at UNC Chapel Hill or via Zoom using both live audio-video conferencing and screen-sharing to mimic in-person facilitation. This augmentation was made to mitigate health risks associated with the COVID-19 pandemic. After participants completed the primary portion of the study, they were interviewed about their experience of the survey regarding user experience feasibility and content validity. This semi-structured interview was conducted using a tool created a-priori by the research team.

### ***Primary study***

A study staff member facilitated participation in two separate portions of the study. Participants completed the first portion of the study on their own by following a link/QR code to a Qualtrics survey that took about 20 minutes to complete. This portion of the study contained question blocks regarding demographic identities, their real-life experiences with sexting, a social discounting task, and a novel sexting-discounting task. Upon completion of the first part, participants were invited to complete the second part, which involved semi-structured open-ended questions about participants' experiences with, perceptions of, and beliefs about sexting to capture qualitative data. In an effort to maximize likelihood of participation, participants were invited to respond to the second part live via a recorded Zoom interview or by responding to a Qualtrics survey with their typed responses or recorded voice memos. This portion lasted about

20 minutes for each participant, and all responses were transcribed by study team members and analyzed using a grounded theory approach.

### **Measures** (See Appendix)

The survey was designed by the research team consisting of the PI, four undergraduate research assistants, a masters-level research assistant, and the Community Liaison. The study team met weekly to discuss updates on tasks (e.g., literature reviews for specific measures), review drafts, and make decisions. A computer scientist with expertise in Qualtrics coding specifically was hired with study funds to execute specific advanced functionalities in the survey. Study funds were also used to hire UNC Creative to create a set of brand images for the survey and all study materials to enhance user experience and engagement.

**Self-reported real-world sexting behavior.** Consistent with the majority of prior work on sexting behavior (Madigan et al., 2018; Hinduja & Patchin 2019), this series of 8 questions asked participants to self-report on the following behaviors: the platforms on which they have ever sent, received, or forwarded sexts; number of sexts forwarded to a participant in the past year; of those received, the number of sexts a participant forwarded (versus did not forward) in the past year; the most recent date (month, year) a participant received a sext (note: not confined to past year); whether or not it was sent in a group message; whether or not they forwarded it in a group message; identifiers that describe their relationship with the person in the photo (e.g., friend, previous sexual partner, friend only known through the internet). This section also provided the definition of sexting used in this study, followed by a knowledge/attention check to ensure participants were aware. Branch logic was used to prevent questions that were non-applicable to students based on previous answers (e.g., students who indicated they never received a sext were not shown questions asking them to describe the person in the photo). These

questions were designed to capture incidence and descriptive information about the nature of sexting behavior. In addition to this method being a convention in this relatively new area of study, the face-valid, self-report approach was selected for several reasons. First, the variables of interest were observable, non-latent, behaviors. In other words, the study is interested in the behavior itself, rather than a complex latent psychological construct that this behavior may represent. Given practical and ethical limits to observational data and multi-informant data that may confer optimal validity (e.g., text message/other platform records; obtaining reports from key informants for each participant), obtaining self-reports from participants using tools that have demonstrated utility in previous work was the approach that would most closely capture the actual manifestation of this behavior (Borgstede & Eggert, 2022). Second, the current study was interested in maintaining clinical significance and practical interpretability to the extent possible (Page, 2014). Next, scales that ask about sexting behaviors ultimately aim to examine related constructs like cyberbullying at large (Chun et al., 2020). Using these measures would arguably only obscure signal with increased noise in the current study. Finally, digital behavioral evolution has occurred rapidly since the popularization of smartphones. Based on data that differentiates main effects of time and generation in how technology is used, it is expected that measures designed to examine past sexting and cyberbullying behavior may be somewhat outdated today (Giarlia, 2019).

Real world sexting behavior: Closeness and popularity ratings of the individual in the photo (i.e., the victim). The *Inclusion of Other-in-Self (IOS; Aron et al., 1992)* tool was included in this set of questions to assess participants' sense of closeness with the individual pictured in the sext they last received. A single-item task shows participants 7 images, each containing two circles with increasing overlap. The left circle is labeled "self" and the right labeled, "other."



Participants were asked to use the visual-analog scale embedded in Qualtrics to indicate how close they felt to the person pictured in the photo. This measure has demonstrated sound psychometric properties in its utility for measuring perceived interpersonal closeness use with children, adolescents, and adults (Ketay et al., 2020; Vezzali et al., 2016). Exploratorily, the current research team assessed for perceptions of popularity by loosely adapting this measure to fit a popularity construct. No visual was depicted, but participants were asked to rate how popular that individual was using the VAS scale.

**Open-ended survey questions about sexting decisions.** This measure was designed to capture qualitatively rich insights from participants to help contextualize quantitative results. Creation and delivery was informed by literature on interviewing for a grounded theory analysis (Charmaz & Belgrave, 2012). The questions were created by the research team and revised based on responses from the pilot study. The aim to capture participants' freely self-reported answers to the central questions of the study, which remain un-answered by the current literature. The questions included items such as, "Why do you think people send their own sexts/nudes?" and "Why do you think people share other people's sexts/nudes without consent to do so?" Per convention, interviewers were at liberty to ask follow-up or clarifying questions in response to what participants' shared. Most participants completed this portion via live synchronous in person interview and via zoom. In an effort to obtain sufficiently valid data from as many participants as possible, if participants were not able to attend or complete in full a synchronous interview after extensive recruitment efforts were made, they were permitted to type and submit their responses to the questions a-synchronously via a Qualtrics form designed for this purpose. Live interviews were recorded and transcribed for qualitative coding, as detailed below.

**Social discounting tasks and sexting discounting tasks.** The original social discounting task (Jones & Rachlin, 2006) was adapted for use with an adolescent population informed by augments made in a previous study with youth (Sharp et al., 2012), responses from the pilot study, expert consult, and best practices for conducting assessments with youth (Davies & Scott, 2016). This task asks presents participants with a series of binary hypothetical choices where they are asked to choose between keeping a sum of money, \$150, for themselves (Option A) versus splitting it, \$75 each, with another person (Option B). The other person in Option B is then specified to be an individual at the following levels of social distance: a very close social distance (i.e., best friend), a moderate social distance (i.e., friend but not best friend), a substantial social distance (i.e., a peer at school that you know of but don't know personally), and maximal social distance (i.e., an unknown peer who may or may not go to your school). These items were assigned social distances of 1, 5, 10, and 50. The rate of discounting determined by this measure is denoted as  $S_{preference}$  throughout.

To measure popularity discounting (i.e., the rate at which participants were willing to forego money for themselves to curry favor with a person who has high social capital in their context), trials were added where “other person” in Option B was someone they consider to be the most popular or influential person at school, a very popular or influential at school, a somewhat popular or influential person at school, and someone who is not popular or influential at all. These items were assigned popularity distances of 1, 5, 10, and 50. All trials were randomized to prevent order effects. This measure is denoted as  $S_{popularity}$ .

This value of preference can be represented by the coefficient  $N$ , or perceived social distance. Then, the rate at which a person discounts social distance is calculated using the equation  $v = V/(1+SN)$ , where  $v$  is the discounted value of the reward,  $V$  is the undiscounted

value of the reward,  $S$  is a constant measuring degree of discounting and  $N$  is social distance (Jones & Rachlin, 2006). Money has historically been used in discounting tasks as it is universally valued, and therefore not subject to individual preference effects (Ostaszewski & Osiński, 2011). Further, several scholars have demonstrated that monetary values are ecologically valid proxy measures for capturing this generalized phenomenon that humans engage in using other demonstrations of altruism (Jeuland, 2010; Vasiliy, Locey, & Rachlin, 2013).

The primary departures from the original task used the current version are as follows. First, a simple illustration accompanied the question to enhance the ease of the user experience, thereby creating less distress for youth, especially those for whom reading is cumbersome, and increase the chances of obtaining quality data. Second, the original social discounting task uses seven social distance positions (compared to our four) and includes 10 trials at each position, each decreasing by \$10 from \$115 to \$75, as the amount an individual could keep for themselves. Titrating the magnitude of the “selfish” option and assessing comprehensively across distance increase the specificity with which the “indifference point” can be identified, and overall provides a more detailed picture. However, feedback from the pilot study, research team, and several expert consultants suggested that this burden would not be tolerated by participants. The approach taken was to obtain as much data as believed was necessary to capture the rate of discount, and 4 trials with one amount was determined to be justifiable. Finally, the initial task asks individuals to imagine a list of 100 people, where the lower numbers represent close friends and family, and the individuals closer to 100 are distant acquaintances. Sharp and colleagues (2012) reflected that their high degree of non-systematic data may have been due to the cognitive demand for abstract thinking and working memory usage of this part of the task. As such, we

reduced the need to think about relative closeness of people in one’s life, and create, recall, and think flexibly about the assigned numerical representation by inserting the description of the position (e.g., “best friend”) into the item itself.

Sexting Discounting Tasks: Based on the social discounting task, the research team developed a novel paradigm specific to the decision point in which a student receives a sext to their phone, and chooses to share it with at least one other person versus not share it. Hayshi and Tahmasbi (2021) successfully created a novel discounting-based task to assess cyberbullying decisions among a college student population. The study team used their procedure as guidance where applicable, and drew upon other situationally-specific discounting and decision-making tasks (Collado et al., 2017; Buelow & Suhr, 2009). In the current study, instructions presented the following vignette, with short lines of text separated by illustrations: “For this question, imagine that a sext (i.e., a nude photo) of a student at your school was forwarded to students it was not meant for without their permission. Now, many students in your school are sending and showing it to each other. / Through the grapevine, you learn the name of the student in the photo, and its not someone you know. By the end of the day, someone sends the photo to you and you open it. / Do you forward the nude photo to someone else?” A VAS scale with options “no, maybe, and yes” on the left, middle, and right sides is presented for students to provide their answer. Following this trial, the directions continue, “Now, imagine the same situation happened, but the photo that’s going around is someone that you DO know. Would you share it if the person in the photo was...” Now, a series of 7 VAS bars appear for participants to answer the question, each containing an ending to them stem provided (e.g., “...best friend”) and disappearing after the question is answered. Though participants are shown a sliding scale of likelihood of No—Maybe—Yes, the back-end coding encoded their response on a scale 0-100.

These values were divided by 100 and inversely coded such that 1 is a very altruistic answer and 0 is a very selfish answer. These measures are denoted as  $SX_{preference}$  and  $SX_{popularity}$ .

**Demographics and identity.** Participants were asked to report on their age and grade, gender, sex assigned at birth, race/ethnicity, religious and/or spiritual identity, perceived family resources/SES, disabilities, self-perception of popularity/influence.

### **Analytic plan.**

**Data Preparation.** No measure is missing greater than 10% of participant responses, so analyses were conducted as planned. SPSS version 28 was used for database management, *Rstudio* version 2022.07 was used to conduct statistical analyses except for the Latent Profile Analysis in Aim 3, for which *Mplus* version 8.8 was used. *MaxQDA.2022* was used to manage, code, and analyze all qualitative data, and dynamic visualizations (Figures 1 and 2) were created using *Tableau* version 2022.4.

**Qualitative analysis.** Qualitative data was captured using open-ended questions that addressed data related to each Aim. Thus, analytic specifics of the qualitative data relevant to each Aim are discussed below in accordance with the thematic organization. The following will describe the overarching qualitative analysis plan common across aims: A Grounded Theory approach was employed by the Principal Investigator and the Community Liaison, with consulting from an expert in this methodology named in this role on the mentorship team gathered at the proposal stage of this project. A total of 790 segments were assigned at least one code.

Grounded Theory is a qualitative inquiry framework that allows for participants to offer their unfiltered experience of a phenomenon, especially useful for building an initial understanding of an understudied, new, or mis-specified phenomenon (Walker & Myrick, 2006).

Researchers observe, organize, and synthesize the data to grow their understanding of the phenomenon in a collaborative, iterative, ground-up method of generating knowledge (Glaser, 1978; Strauss & Corbin, 1990). Specifically, the “Evolved” approach within Grounded Theory was selected for use in this project for its focus on “symbolic interactionism,” a sociological concept that understands phenomena by first understanding individuals’ subjective mental representations that they each bring to a situation (Corbin & Strauss, 2008). Among Chamberlin-Salaun and colleagues’ (2013) 16 assumptions that underpin Evolved Grounded Theory, three aspects in particular signal utility for the current study. First, this framework posits that mentalization (Luyten et al., 2012) creates unique internal representations for the external world such that each person at any moment is present in both the external world, and their unique cognitive representation of it. Second, there is dynamic interplay in social experiential learning which changes one’s internal representations as well as their external behavior. Finally, contingencies may and will develop in any social process, which can alter the temporality, function, or other context of a social process. These assumptions are shared by the other key theoretical foundations guiding the current study, Construal Level Theory/ Social Discounting Theory (e.g., mental construals guide external decision-making), and Functional Behavior (e.g., if behavior is functional, shifts in contingencies accordingly alter behavioral processes). Thus, this approach to qualitative data analysis was employed.

In practice, all interview responses were transcribed by a member of the research team, and reviewed for accuracy by the Principal Investigator. Questions (Appendix A) were iteratively determined in the study creation phase, and revised based on feedback from the pilot study, by the PI and CL. The analytic process involved three phases: open coding, axial coding, and selective coding (Walker & Myrick, 2006; Mohajan & Mohajan, 2022f). First, in the open

coding phase both coders reviewed all materials to naively make note of patterns and major themes observed (Glaser, 1992). Coders met regularly to share results from open coding as they processed the materials, and iteratively developed a set of codes that were applied in the axial phase (i.e., applying found themes to code the full qualitative dataset). In the axial phase, the coders met regularly to collaboratively analyze relations among the codes (Bryman, 2012; Jones & Alony, 2011). For the purposes of this dissertation study, the PI completed selective coding independently. This phase involves selecting the core codes and relations to around which to organize the others, and involves prioritization among several narratives that may be revealed in the data (Corbin & Strauss, 2002; Williams & Moser, 2019)

### **Aim 1. Examine current real-world sexting prevalence rates, types, and context**

**1a. Quantitative analyses.** Quantitative analyses addressing Aim 1 involved the following sequential approach. (1) Sample descriptive statistics for each variable measured were computed and inspected, see Tables 1 through 8. (2) Top-down analysis: Identity groups (gender identity, sexual orientation, race/ethnicity) were compared using bi-variate correlations and simple means comparisons.

**1b. Data visualization** was used to assess trends among identities of individuals involved in non-consensual sext forwarding, see Figure 1 and accompanying link. The advantage to this approach is that multiple identity dimensions could be captured at once (e.g., gender, sexual orientation, and race), which allowed for insight into subgroups of students engaging in specific activity that siloed variable-centered analyses would not necessarily be able to capture (e.g., queer and lesbian cisgender white girls engage in a specific behavior that would not be captured in mean-comparisons within levels of gender, sexuality, and race). Also, to assess the platforms participants reported using for sexting, another dynamic visualization was created to facilitate

exploring within-person trends in specific platforms used as well as number of platforms used, see Figure 2 and accompanying link.

**1c. Qualitative analyses.** Ground-up analyses: Qualitative data relevant to this aim were focused on understanding the nature of sexting behavior and its contexts among this sample. Data to this end were analyzed in the singular Evolved Grounded Theory analysis, though presented with Aim 1 in the Results section.

**Aim 2. Examine social discounting of preferential and popular peers as a predictors of real-world and hypothetical sexting behavior.** The following procedure was used to calculate  $S_{preference}$  and  $S_{popularity}$ . The analytic approach used was identical for each measure, though the discount rates were calculated independently (i.e., each participant has one value for  $S_{preference}$  and one for  $S_{popularity}$ ). All discounting data were assessed for orderliness and cleaned according to guidelines by Johnson and Bickel (2008).

#### **Calculating discount rates $S_{preference}$ and $S_{popularity}$**

Discount rates were calculated using the  $AUC_{ord}$  method (Borges et al., 2017), an adjustment to the original Area-Under-the-Curve calculation found in Rachlin and Jones (2000).  $AUC_{ord}$  is an ordinal transformation of the delay scale (i.e., x-axis), which corrects for pseudoexponential delay scaling (e.g., disproportionately large contributions of the early data points to the total AUC value) and retains theoretical neutrality. Thus, AUC was calculated by summing the area of the polygons yielded by plotting indifference points  $v$  where the x-axis represents social distance and the y-axis represents the subjective value of the indifference point value on a scale of 0 to 1 (i.e., likelihood of making the altruistic choice).  $V$ , or the undiscounted/objective value of the reward was fixed at 1, because this project was not concerned with quantifying the undiscounted reward or exploring magnitude effects. The ordinal



correction was made to the x-axis “social distance” values such that each “distance” was replaced with an integer 0 to 3, yielding polygons between indifference points of equal width. Given the lack of traditional conventions for measuring social distance, unlike another dimension, such as time or physical distance, this adjustment is particularly appropriate.

**Testing associations between discount rates ( $S_{preference}$ ,  $S_{popularity}$ ) and sexting behavior (real world self-reported, hypothetical).**

Each discounting measure was tested as a predictor of past real-world sexting behavior and hypothetical sexting behavior, each using a receiving operator curve (ROC) analysis. In total, four ROC analyses were conducted:  $S_{preference}$  predicting real-world and hypothetical outcomes, and  $S_{popularity}$  predicting real world and hypothetical outcomes. This method assesses whether or not the proposed method is indeed an effective predictor of the outcome behavior beyond chance by plotting the data such that the x-axis coordinate is sensitivity (i.e., the probability that the model predicts a true positive outcome) and the y-axis coordinate is the inverse of specificity (i.e., 1- specificity, where specificity the probability of a true negative and the inverse value represents the probability of a false positive outcome). The AUC of this curve is calculated and assessed against 0.5 as an AUC reference value (theoretically a diagonal line at a 45-degree angle that starts at 0 and splits the chart area in half), which would signify the model is no more accurate than random chance at predicting true outcomes.

The qualitative analysis process is described above. Codes relevant to this Aim were established in that process, though primarily draw from Questions 2 and 3 on the interview questions list.

**Aim 3. Examine the utility of a novel sexting-specific discounting task compared to the domain-general Social Discounting task.**

The novel sexting discounting tasks are structured nearly identically to the social discounting tasks. So, the data needed to be closely inspected, though the same protocol was used for this Aim as it was for Aim 2. This behavioral measure attempts to capture the presence of a decision-making process, determined by a mathematical function. So, the first point of inspection is data orderliness. If data are not orderly such that they could reasonably have resulted from the same function, this measure is not reliable between trials, and thus is questionably valid on this point alone. Using the procedures outlined in Aim 2, data orderliness and  $AUC_{ord}$  values were calculated based on the novel sexting-discounting behavioral measures to assess the degree to which these specific decisions are made lawfully in accordance with predictions based on social discounting theory. Correlations among  $AUC_{ord}$  values for social discounting and  $AUC_{ord}$  values for  $S_{preference}$  and  $S_{popularity}$  on the sexting discounting measures were calculated to assess convergence among these measures. Finally, a latent class analysis is used to explore within-person patterns of intercorrelations among all four discount rates. To assess heterogeneity in the ways each discounting measure presented intra-personally, we performed Latent Profile Analysis (LPA) using *Mplus 8.8*. To determine the best fitting number of classes, we fit a series of five models where the number of classes imposed was increased by one class until fit and meaningful interpretability became unacceptable at five classes. We then assessed comparisons between models based on meaningful interpretability as well as the following conventionally used metrics of fit: 2 Log Likelihood (-2LL), Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), Sample-Size Adjusted BIC (SSBIC), Consistent Akaike Information Criteria (CAIC), Approximate Weight of Evidence Criterion (AWE), the Lo-Mendell-Rubin adjusted likelihood ratio test (LMRT), and the bootstrapped likelihood ratio test (BLRT; Lanza, Tan, & Bray, 2013; Masyn, 2013; Nylund, Asparouhov, &

Muthén, 2007). Decreasing -2LL, AIC, BIC, SSBIC, CAIC, and AWE values signal fit improvement compared to the model with one fewer class (Nylund et al., 2007). The LMRT and BLRT test significance of the reduction in -2LL between a  $k$  class model and a  $k-1$  class model, which provides a quantitative assessment that adds to the available preponderance of evidence upon which to base justification for retaining the model selected (Lo et al. 2001). Entropy, which measures global class separation in a model, was also inspected. Values range from 0 to 1 where values above 0.80 suggest conventionally acceptable class separation (i.e., the global odds that the most likely members of each class would get sorted into that class consistently; Grimm et al., 2016). A four-class solution was retained on this basis, Figure 1. Most-likely class membership is retained as variable, and patterns among characteristics of class members are explored using descriptive statistics in Table 13.

**Aim 4. Exploratory: What novel insights do qualitative reports yield about sexting context, perceptions, or beliefs?** This aim acknowledges the potential for qualitative data to illuminate themes and relations that could not have been identified a-priori, yet enhance the value of the study. Findings that met this criteria were established during the singular Grounded Theory analysis, though for organizational and thematic consistency, are presented within the Aim 4 section of the Results.

## CHAPTER IV: RESULTS

**Pilot study.** Overall, the pilot study data, discussions among the research team, and advising from several expert consultants yielded three primary points of feedback: The study was far too long and cumbersome, it was inaccessible on mobile devices, and participants were more inclined to provide qualitative data verbally than by typing. Thus, adjustments were made on these bases. UNC Creative was engaged to assist with guiding user experience, the survey was

optimized for mobile completion, only critical measures and items were retained (e.g., the discounting tasks were heavily reduced), and participation was split into two phases for the primary study. The split was created to balance participant attention as well as meaningfully allocate study team labor.

## **Aim 1. Examine current real-world sexting prevalence rates, types, and context**

### **Sample Characteristics**

The sample consisted of N=213 participants recruited from a High School located in the mid-western United states. Convenience sampling was facilitated in partnership with the school and a community liaison. See Tables 1 through 8 for a comprehensive report of the identities and demographics of this sample. In summary, more participants from grades 9 (40% of sample) and 12 (29% of sample) were captured compared to grades 10 (15%) and 11 (36%), but all grades are somewhat represented, with a mean age of 16.01 years and standard deviation of 1.55 years. Racially, the sample is fairly diverse, though is not sufficiently representative of all racial identities. Regarding monoracial identities, Caucasian/white individuals comprise 35.7%, Latiné individuals comprise 27.7%, Black/African-American individuals comprise 7.5%, and Asian (includes Southeast Asian, Middle-East) individuals make up 5% of the sample, Indigenous people make up 0.5% of the sample. About 8% of the sample is bi-racial, with Latiné-Caucasian/white being the most common biracial identity (2.8% of the sample). Other bi-racial identities participants endorsed are Indigenous & Asian (0.5%), Indigenous & Latiné (1%) Asian & Caucasian/white (1.5%), Black/African-American & Caucasian/white (0.5%), and Black/African-American & Latiné (0.5%), see Table 4. This sample's racial composition is fairly representative of the school's racial composition overall 37% Caucasian/White, 56.7% Hispanic, 2.5% two or more races reported, 2.0% Asian, 1.4% Black/African-American, 0.2% Indigenous.

Regarding heritage and family cultural background, the sample is fairly heterogeneous based on inferences from immigration history and language spoken at home. A minority of the sample, 3%, report being born outside the United States, and moving to the United States between the ages of 2 months old and 17 years old. Most participants endorsed speaking English at home (79%, including participants who endorsed English in addition to another language). The next most commonly spoken language is Spanish (13.6%), followed by Polish (5.6%), Arabic (3.8%), and French, Czech, and Vietnamese (each 0.5%). 7% report speaking more than one language in their home.

Participants represent a variety of religious identities and faith and/or spirituality practices. See Table 8 for complete report, including mean and standard deviation of how important religion is in each individual's life by identifier. 4.2% of participants did not respond to this item, 50.2% endorsed Christianity, about 10% endorsed being spiritual though non-religious, Muslim, and Atheist, respectively. Less than 10% of the sample endorsed Judaism, Hinduism, Buddhism, Agnosticism, or another religion. Level of importance of religion spanned the entire range of the scale (0-100), signaling a diversity of faith practices among participants.

Regarding socio-economic status, participants reported on their perceptions of their family's wealth and resources (Quon et al., 2004). Results indicated that a small minority (2.3%) of participants are not able to meet their basic needs with current available resources. The majority of the sample can be conceptualized as middle class, with 20.2% reporting being able to cover basic needs despite money being tight, and 23.5% reporting that money is not a problem though they have minimal excess income. 13.6% of the sample reports that money is not a problem for their families, and they have extra discretionary resources. Interestingly, 40% of participants indicated that they were not sure how to answer the question, or that they did not

want to respond, or just skipped this item. This level of missingness is uniquely high on the current survey, as the next highest proportion of missingness of any item is 10%.

Most participants reported being non-disabled (82%), while 7.5% reported having a disability (or more than 1), about 10% are either not sure if they are disabled or not or preferred not to answer. One person did not respond to this item. Disabilities, differences, or impairments listed specifically included Anxiety disorders, Adjustment Disorder, Attention-Deficit/Hyperactivity Disorder, Chronic Pain Disorder, Fibromyalgia, Hearing loss, Depressive/Mood Disorders, Reproductive health issues, Post-Traumatic Stress Disorder, and Type 2 Autoimmune Hepatitis. See Table 6 for complete report.

Regarding gender and sexuality, participants were invited to endorse and/or share any identity that applied to them, and the complete report of multi-identification can be found in Tables 3-4. In terms of gender, the sample spans an array of identities: 60% identify as a boy, 36% identify as a girl, and about 4% of the sample endorse at least one of the following non-binary gender identities: agender or gendervoid, genderfluid, non-binary, trans or transgender, one that is not listed or are unsure at the moment. A majority of the sample endorsed being heterosexual/straight (79%). Bisexual was endorsed by 13% of participants, gay and lesbian each by 2.5%, asexual, queer, and pansexual each by 0.5-1%, and about 3% reported being unsure.

### **Demographically, who is involved in sexting?**

Regarding who is involved in sexting, being a boy (versus not endorsing boy as a gender) had a very small but significant inverse association with endorsing sending a nude photo to a peer in the last year ( $r = -.14, p = .05$ ), while endorsing a Latiné ( $r = .32, p < .01$ ) or Caucasian/White ( $r = .25, p < .01$ ) ethnoracial identity (versus not endorsing each identity) showed a small positive correlation with sending one's own nudes, such that students who took nudes

photos of themselves were somewhat less likely to be boys (compared to other genders) and somewhat more likely to be Latiné and/or White compared to other ethno-racial identities. Importance of religion or spirituality in one's life had a small positive association ( $r=.18, p<.05$ ) with sending one's own nudes, such that more religious students were slightly more likely to send nudes. Endorsing a Jewish identity and age were modestly inversely associated with this behavior, such older ( $r=-.33, p<.05$ ) and Jewish students ( $r=-.17, P<.05$ ) were less likely to share nude photos of themselves.

Regarding receiving sexts, correlations with each gender identity revealed only two significant associations: boys were less likely ( $r=-.32, p<.01$ ) and girls were more likely ( $r=.28, p<.01$ ) to have been sent a nude photo by a peer in the last calendar year. Age was also inversely correlated such that younger students were somewhat more likely than older students to report having received a sext in the last year ( $r=-.31, p<.01$ ). Caucasian/white ( $r=.15, p>.05$ ), Latiné ( $r=.29, p<.01$ ), and students who endorsed only 1 racial identity (compared to bi-racial students;  $r=.14, p<.05$ ) were all somewhat more likely to have received a sext, compared to endorsements of the other racial identities.

Regarding forwarding a sext to at least one other individual or group, boys were somewhat more likely to have done so ( $r=.30, p<.01$ ) and girls were less likely to have done so ( $r=-.15, p<.05$ ). Latiné ( $r=-.26, p<.05$ ) and bi-racial ( $r=-.24, p<.05$ ) individuals were also less likely to have forwarded, and white individuals were more likely to have forwarded ( $r=.17, p<.05$ ).

There were no significant associations between each of these behaviors (i.e., sending one's own nude photos, receiving another person's, or forwarding sexts) and disability status, socio-economic status, sexual orientation, or country of birth (US versus born in another

country). A visual inspection by toggling identity levels within the dynamic data visualization (Figures 1) does not readily highlight any associations between sexting involvement and any identity-specific sub-populations within the sample that may not otherwise have been identified, though does show that for participants assigned female at birth, sharing a nude of a less-close peer is far more likely than a closer peer. The same trend is not obvious for males, or when inspecting the sample at large. There are no immediately obvious trends with regard to the popularity axis. A visual inspection of the visualization of platform use (Figure 2), shows that most youth use multiple social media platforms and have received/sent sexts on multiple, with Snapchat is the most common. Further, it seems that Discord users are the least likely to use multiple platforms.

Regarding associations between these behaviors, sharing one's own nudes is positively associated with receiving others' nudes in the last calendar year ( $r=.29, p<.01$ ), though inversely associated with forwarding the photos they received from others in the last calendar year ( $r=-.44, p<.01$ ). On the whole, receiving others' nudes was inversely associated with forwarding them ( $r=-.34, p<.01$ ).

### **Insights from qualitative data: What are the current perceptions of and experiences with sexting and its contexts among this sample?**

Participants' responses to open-ended information gathering questions about sexting (i.e., describing trends in what and how it happens, and important contexts) yielded the following code structure (See Figure 3). The overarching code for this branch of the analysis is "Describing the behavior and its contexts." While the study at large is primarily focused on the specific behavior in which an individual is faced with non-consensually sharing another person's private photo or not, it became immediately clear that this decision point is not mentally distinct from



plenty of other situations in which youth encounter nude photos in their digital worlds.

Therefore, the analyses resulted in zooming out to better understand the ways in which youth encounter sexts/nude photos more generally. This umbrella code is comprised of two sub-categories, which did organically separate the initial sending of a nude photo and the forwarding of a nude photo to others.

1. Taking a nude or sexual photo and sending it to someone: This code was used to capture students' reflections on the situations in which photos originate, or are initially shared with the intended recipient. An understanding of the dynamics that tend to result in a photo being taken or sent for the first time set the stage for understanding some of the ways secondary forwarding emerges. Four situations were repeatedly described by students, so each was assigned a code within this sub-category.

1.1. Romantic or sexual context. This code was used to identify reports from students in which sexts were taken and sent within the context of a sexual or romantic relationship, or with the intent to initiate one.

1.1.1. Shared freely with excitement: Many students shared their perception that sexts originated between adolescents exploring intimacy and closeness in a mutually consenting (to the extent possible given age and development) relationship.

Examples: “...*Because they trust someone and want to have a more intimate relationship*” and “*I send nudes often, maybe once a week, to my long term boyfriend. We've been together for a little over two years. In the beginning of our relationship I probably sent nudes every day.*”

1.1.2. Pressured solicitation or coercion: Students also described instances where individuals requested nude or sexual photos from a romantic or sexual partner using

tactics such as threats, manipulation, persistence, or harassment. Example:

*“Sometimes it's pressure. It be like, oh, if you don't do that, you don't love me or I'm going to leave you, or it's the you don't love me some type of way you don't have the time to do it” and “Like if a boy ask a girl to send nudes, and keep asking until she does it, and tell her if you do it ill be with you forever. And then shell send the nudes and he'll block her.”*

1.1.3. Perception of normality or necessity: This code was initially included in 1.1.2, but felt distinctly different from direct coercion. This code captures the reflections and perceptions that one's, often girls', self-worth and/or romantic value is determined by their sexual appeal to others. While self-objectification often results from internalizing systemic objectifying messages (Feltman & Szymanski, 2018), data coded here do not include a direct coercing agent. For example, a participant (Caucasian, girl) said, *“...I sent nudes to many people, probably about 5 to 10, who I wasn't very close with. I used to think my only value was in getting people off.”*

1.2. Entertainment/sensation-seeking: This code captured responses sharing perceptions that individuals may send or request a nude photo to or from a peer for no ostensible reason beyond momentary entertainment that is comedic or validating at a peer's expense. This theme included both asking for nude photos from someone, and being sent unsolicited photos. Typifying examples of the former are captured in a Latiné non-binary/girl sharing about the phenomenon, *they laugh and they joke, it's funny to them really,*” and a Latiné boy explaining how to execute it: *“You just DM them and say ay shawty, send some arch pics, you gotta be bold with it.”* Regarding the unsolicited photos, they were exclusively reported as being received from boys or of penises, specifically. Descriptions

of receiving a photo of a penis, presumed/IMPLIED to be a photo of the sender himself, were very similar across girls and non-binary genders from all races represented in the sample. Examples include, *“The most recent situation was a guy just sent a dick pic to my DMs, I met him on Reddit and we became friends, we was cool, we chatted about other things, one day randomly he just sent it to my DMs so I had to block.”* Another example is, *“I just got it to my phone, I didn’t even know the number, I knew the person but barely.”* A boy (Caucasian) describes participating in this phenomenon: *“Something about it was fun, and I wasn't really scared about it either since I kept it anonymous you know.”* Six responses (three boys, three girls) described this behavior as specifically labeled it as harassment or sexual harassment.

1.3. Self-exposure for personal gain: Participants reported perceptions that some peers, often girls, took and exposed nude or sexual photos of themselves and intentionally distributed them in efforts to gain “clout,” attention, or financial gain. Examples: *“If it showed her face, then that means she was doing it for some type of reason..”* and *“Some girls these days get their nudes exposed on purpose. You get money for sending nudes. Not only fans, but if you want, there's always going to be a thirsty guy, someone will pay for them.”*

1.4. Incidental non-solicited pornographic image. Though none of the questions asked about this experience specifically, many participants brought it up un-prompted, suggesting that it is relevant to their schemas surrounding sexting. This code was used to identify instances where participants were using digital social platforms for another reason (e.g., gaming, chatting with friends) and either received a pornographic image from an unknown “random” spam or bot account (commonly Snapchat), or incidentally viewed a

pornographic image embedded in unrelated content on a public forum (commonly Discord, Reddit). Notably, these images are in no way connected to peers, and are facilitated by strangers via digital platforms. Examples, “*On the community app [Discord], I’ll tell you the amount of like dick pics that I see, it would be like a stack this high [motions with arms]. No it’s real, and I’m like I don’t like this why would you send this?*” and “*...really, it be those bots on Snapchat that be spamming me.*”

2. Secondary viewing and forwarding the photo to others: This code was used to capture the ways and situations that led to a photo being shared beyond the intended recipient. The function of the behavior is different for each, but the key unifying characteristic is that sext forwarding relies on the social network (beyond the individuals directly involved) to accomplish the intended goal (i.e., reputation improvement, reputation damage). It is comprised of four codes.

2.1. “Flexing:” Participants overwhelmingly reported on behalf of themselves and their perceptions of others, that it is common to forward a nude photo sent in confidence by someone else to show off that they were able to obtain such a photo or that they are dating/wanted by someone deemed highly attractive. Making friends jealous and furthering their reputation were specifically named as ultimate ends to this behavior. Examples: “*...to get clout and make everyone think of them different,*” and “*People probably share other people’s nudes in order to either prove that they had a sexual encounter that they were describing to their friends, or simply to brag about the nudes that they are receiving.*”

2.2. Revenge: Participants shared that seeking revenge on an individual by sharing their nude photos with the social network was a common tactic in their perception. The damage to

the target occurs by making them feel embarrassed, exposed, and humiliated, and is thought to damage their social status. All genders were implicated in this behavior, and the event for which an individual may be seeking revenge is sometimes sexual/romantic in nature but not necessarily. In other words, this tactic can be used to avenge a wrongdoing that did not happen within a dating or sexual relationship. Examples: *“To embarrass the person or make them feel outed to others,” “Humiliation or revenge purposes usually, like [classmate] and [classmate], they dated for two years and he just fucked her over,” and “...like if I’m being put in an argument, I’m trying to win. It’s like you’re trying to be the more annoying person, like to make sure they get what they deserve. If that makes sense,” and “unless she does something to me, yeah I’m not gonna send them to anyone.”*

- 2.3. Entertainment/sensation-seeking. This code parallels Code 1.2, but a key difference is that this phenomenon includes causing widespread harm to a victim in service of entertaining chaos or a boredom salve using the broader social network (i.e., not just feeling entertained by attempting to secure a peer’s nude photos, or a similar peer-to-peer interaction). The intent in this phenomenon is not focused on harm coming to the victim, but rather it is a byproduct with which initiators are unconcerned. Examples: *“They just bored, they ain’t got no life. They immature and they bored,” and “ To stir the pot, mainly. People love spreading gossip nude is the ultimate form of gossip,” and “They don’t think about the repercussions of their actions and how it will affect the other person.”*

- 2.4. Mass public exposure and exploitation: Students described a phenomenon where public accounts on platforms like Instagram, Snapchat, and Discord repeatedly and prominently

share students' nude photos for anyone to view, to the point where they become known to the local high school networks. Students were unsure of how these accounts originated and did not know who was responsible for maintaining them. The suspected motivation for these accounts is also unknown, though portrayals do not suggest consent (to the degree possible) on the victims' part. All students who brought up this phenomenon portrayed it in a negative way and expressed empathy for the individuals in the photos. Students also reported that these accounts were far more active and prevalent during the COVID-19 lockdown compared to today. Examples: *"...and nah I've seen girls from [school] that literally got their nudes exposed for 2 years straight, just non-stop accounts posting them I swear to god, I don't know it's messed up, its a trend tho. They make it a trending topic to be honest...she transferred to another school."* Another example is, *"...like 2 or 3 years ago, this one account "wanna be bangers," there was like 8 of them [accounts], they would post girls from like Southside and everywhere...the accounts got a lot of rep because they would just repost and repost."* and *"Oh during covid busting from my phone, it was like every day I was seeing someone's nudes man, everybody was at home."* One segment notes that one of these accounts had 10,000 followers, and leaked a nude photo of a girl that he know of from school.

**Aim 2. Examine social discounting of preferential and popular peers as a predictors of real-world self-reported sexting behavior.**

**Data orderliness.** Descriptive statistics regarding all discounting data were computed and tabled. Guidelines provided by Johnson and Bickel (2008) were used to assess discount data orderliness, as described in the analytic plan. These mathematical guidelines are predicated on the theoretical basis that the task may be functioning differently for these participants. Instead of

activating a construal-based discounting process, a different process is guiding the decision making. For example, perhaps the effort investment is causing the distal outcomes to gain subjective value (rather than lose it) over time for a participant, or a participant does not understand the questions or is attempting to finish quickly and thus does not yield valid data (Johnson & Bickel, 2008). Authors caution against rigid adherence to these specific guidelines at the risk of managing one's data in accordance with study goals, as the parameters proposed (e.g., 20% in criteria 1, 10% in criteria 2), were selected with intention (e.g., 20% allows for some level of variance that may be normal, or occur due to imprecise sliding on the digital VAS scale), but are ultimately arbitrary. As such, we examined current data in terms of these criteria, and will interpret results through this lens. We have opted to not exclude any participants given the relatively low incidence of non-systematic appearance and exploratory nature of the study.

Johnson and Bickel's (2008) first criteria for identifying non-systematic data is the presence of a data point greater than the previous point in value by more than 20% of the distal outcome (i.e., the altruistic choice, which has been dummy quantified as 1, thus the cut point in the current study is .20). Applying this criterion to current study data, 4 participants yielded one non-systematic datapoint on the social discounting—preference task, 18 participants contained one on the social discounting—popularity task, 19 participants contained one and 1 participant contained two non-systematic points on the sexting discounting—preference task, and 28 participants contained one and 1 participant contained two non-systematic points on the sexting discounting—popularity task (Johnson & Bickel, 2008). Examining these trends within-participant across all four measures, one participant yielded one non-systematic data point on three measures, 14 participants yielded one non-systematic data point on two measures, 36 participants yielded one non-systematic data point on one measure, and two participants yielded

two-non-systematic data points on one measure each. The second criteria Johnson and Bickel (2008) proposed using for identifying non-systematic data is individuals whose most distal datapoint on the x-axis (i.e., most socially distant, least influential) is subjectively valued by the participant at a value more than 10% greater than the subjective value they assign to the most proximal data point on the x-axis (i.e., best friend, most popular). In the current dataset, 0 participants meet this criteria on Social Discounting—Preference, 10 participants meet this criteria for the Social Discounting—popularity measure, 18 participants on the sext discounting—preference measure, and 30 participants on the sext discounting—popularity measure met this criteria.

**Testing associations between discount rates ( $S_{preference}$ ,  $S_{popularity}$ ) and sexting behavior (real world self-reported, hypothetical).** Table 11 contains descriptive statistics and Pearson correlations among social discount rates (measured in  $AUC_{ord}$ )  $S_{preference}$  ( $M = .65$   $SD = .38$ ) and  $S_{popularity}$  ( $M = .52$ ,  $SD = .45$ ). Regarding preference discounting, social and sexting discounting rates of preferential peers show a statistically significant correlation,  $r = .83$ ,  $p < .001$ . A summary of the ROC findings can be found in Table 10. ROC model 1 found that  $S_{preference}$  values predicted hypothetical sexting behavior (i.e., a student’s VAS response regarding the probability that they would forward a sext to at least one other person in a hypothetical vignette in which their best friend is the “victim” in the photo) significantly better than chance ( $AUC = .81$ ,  $SE = .07$ ,  $p = .001$ ). Model 2 found that  $S_{preference}$  values also predicted hypothetical sexting behavior significantly better than chance when the victim in the vignette was described an unknown classmate, but less strongly compared to Model 1 ( $AUC = .69$ ,  $SE = .05$ ,  $p = .001$ ). Model 3 finds that  $S_{popularity}$  is not a significant predictor of hypothetical sext-forwarding in the case of a highly popular individual being the victim beyond chance,  $AUC = .51$ ,  $SE = .07$ ,  $p$



=.901. Model 4 yield similar results:  $S_{popularity}$  also did not significantly predict hypothetical sexting behavior outcome in which the victim presented in the hypothetical scenario was named as not at all influential,  $AUC = .50$ ,  $SE = .06$ ,  $p = .923$ . In summary,  $S_{preference}$ , the rate at which an individual discounts the value of extending altruism to another person as a function of perceived social distance, is a significantly better predictor than random chance of participants decisions to non-consensually forward a sext, based on both self-reported actual behavior and a hypothetical scenario. In other words, using these models to predict sexting decisions would yield more true predictions than if you guessed what the outcome would be (forwarded vs not forwarded) by flipping a coin. However,  $S_{popularity}$ , the measure created based on discounting decisions across a continuum of perceived popularity rather than closeness, would not provide any more correct answers as to what a participant chose to do than you would obtain from flipping a coin to make your guess.

Regarding real-world sexting behavior,  $N = 158$  participants (out of  $N=213$ ) reported having ever received a sext, and had thus faced this dilemma. So, only this subsample was used for ROC Models 5 and 6 which examined  $S_{preference}$  and  $S_{popularity}$  respectively as a predictors of real-world sext-forwarding. To assess the predictive value of  $S_{preference}$  and  $S_{popularity}$ , for the decision made regarding the most recent sext received (forwarded or not), the expected subjective value  $S$  for each was calculated using the participant's overall k-value and their rating of closeness or popularity of the victim in the scenario. This step is necessary given that participants reported a range of closeness to the victim in their most recent sexting dilemma, so for the ROC analysis to be interpretable, the decision they made in real life had to be contextualized on the individual level. For example, the survey question asked participants to think about the last time they received a sext. For participant A, the photo was of her best friend

and she felt awful knowing her friend had been violated in this way. For participant B, the most recent sext she received was a photo in a group chat of a barely known acquaintance from another school. Participants A and B overall have the exact same rate of discount, and make all the identical decisions. However, if we simply coded the outcome variable as 0 for participant A who didn't send it, and 1 for participant B who did send it, the analysis would lead us to incorrectly believe that the girls made two different decisions in the same scenario. Thus, the above step was taken to adjust for the context of the outcome each participant is reporting on to create equivalence between participants, which allows us to get a meaningful answer to the question, "do this model accurately predict what participants most recently did in real life?" In the original discounting equation— $v = 1/(1+SD)$ . Variable  $v$  is the expected subjective value,  $S$  is the rate of discount,  $D$  is the "distance" on the x-axis. The expected subjective value  $v$ , or y-axis value, ranges between 0 (a fully discounted outcome, would act selfishly) and 1 (no discounting, likely to act altruistically). These adjusted expected values were used as the outcome in the ROC analysis, and  $S_{preference}$  and  $S_{popularity}$  discount rates were used as predictors, analogous to Models 1 through 4. Model 5, which used  $S_{preference}$  as the predictor, yielded a statistically significant though modest AUC, suggesting that this social discount measure predicted past real-world behavior consistently somewhat better than chance (AUC= .61,  $SE = .05$ ,  $p = .025$ ). Regarding  $S_{popularity}$ , the ROC analysis yielded similar though slightly improved results, suggesting that the popularity discounting measure predicted past real-world sexting behavior consistently somewhat better than chance (and marginally better than  $S_{preference}$ ; AUC = .64,  $SE = .04$ ,  $p = .003$ ). In summary,  $S_{preference}$  predicted real-world sexting behavior somewhat better than chance, but was a better predictor of the hypothetical behavior outcome.  $S_{popularity}$ , which was not at all helpful for predicting hypothetical outcomes, basically matched  $S_{preference}$ , on its ability to predict real-world

self-reported sexting. So, both S values predict correct outcomes (i.e., what participants actually did) a little better than flipping a coin would. If you had to pick one of them to choose over the other,  $S_{popularity}$  may have a slight advantage but they would predict correct outcomes nearly the same number of times.

**Qualitative insights on the roles of victim preference and popularity in sexting decisions.** Codes related to social distance/preference were largely confirmatory of a-priori hypotheses, though did highlight aspects of closeness that are closely tied to this behavior that this study did not account for. Moreover, popularity is a substantially more complex construct in its relations with sexting behavior than initially conceptualized, according to the current data.

3. Relationship with person in the photo served as an umbrella category with 298 coded segments, that were sub-coded with the following specifiers. The stated goals of this aim center on better understanding sext forwarding specifically. Segments pertaining to instances in which sexts are shared in a consensual and/or relationship context, as captured by section 1.1.1. are excluded from this theme.

3.1 Closeness with person in the photo. This code was used to identify responses in which interpersonal closeness with the victim was connected to an emotional, cognitive, and/or behavioral response (243 coded segments). A gendered trend emerged within this code, prompting sub-categories.

3.1.1. Girl, femme, and non-binary gender victims. Individuals from all genders shared concern for and/or inclination to protect or care for the victim if she was a close person and a girl or a non-binary gender (101 segments). For example a Latino, heterosexual, boy responded, *“It wouldn't matter if it was someone that I didn't know. But if it's like one of my friends, that's when I start having a problem, because if it's especially, if it's one of my female friends, yeah that's*

*when I'm going to start having a problem.” Another boy, who is bi-racial Latino and Caucasian shared, “...if I had a sister, boy, and he did this to her I'd kill him. I would still be pretty upset if it was one of my female friends to be honest.” Examples from participants who identify as girls and non-binary genders also expressed intent to act altruistically in this situation. Examples from one Caucasian student and two Latiné students are examples of many students who believed they would act this way hypothetically or had reacted this way in the past: “...if I was close to them I would do something about it, tell them,” and “...if you are the friend that has to see it, you can't really do much about it because you don't want to get involved and you don't want to make it any worse than what it already has become for them, so if anything, just leave it how it is. Like you can't really help or die it out. Or unsee it.” Similarly, “ I felt grossed out. I thought the person who shared it was gross. I immediately told the person...they were a close friend of mine. If they weren't, I probably would've just felt bad.”*

3.1.2. Boy victims. Comparatively, the trend across recipients of all genders was to be unamused, offended, “grossed out,” or make light of the situation when the victim in the photo was a boy, or more specifically, when the genitalia pictured in the photo was a penis (55 coded segments).

Five heterosexual boys (racial identities include Black, Latiné, and Caucasian) shared stories or reports that involved sexts with a known, close, male victim (22 segments). In these shares, boys were not concerned with any hurt caused to their friend or a need to protect, but rather seemed to respond with antagonization (degree to which it is playful is both varied and unclear across stories), negative judgement, or apathy. For example, one boy shared, “*My friend [NAME] was on the toilet, and he just sent a picture of it [his penis]. He meant to send it to his girl but he sent it to like a group chat full of everyone, I swear to god. I saved it so fast. Him, he's one of my best friends, So obviously I sent it to my guys, and we all started trolling him, it was a trend for like a*

month, just in our group chat. He'd be like "screw you" and I just sent the picture like hey what did you say? (laughs) It was just a group chat troll. Another boy shared based on a similar experience with a friend that he, "look[s] at him a little different now." When asked to elaborate on what felt different, he shrugged and said, "I don't know, I guess not really." Girls and non-binary respondents tended to report being annoyed, upset and/or apathetic when receiving nude photos of a male friend or boy they knew well. A typifying response from a participant is (a non-binary gender, Asian) is, "I felt disturbed, because at first I was not sure if it was a publicly shared picture or one from a private conversation that eventually got leaked...when I realized it, if I remember correctly I just changed the conversation." Another example is a participant's (girl, Caucasian) response to a friend sending her a photo of another friend's penis that had been leaked. She reported, "it was vulgar and I was annoyed. I told my friend not to send me that stuff again." The words "grossed-out" and "uncomfortable" were also used by multiple participants.

3.2 Distance from victim. Students across identity levels reported on the unique nature of experiences and perceptions when the individual in the photo is someone unknown, little known, or feels very socially distant (89 segments). Overall, increased social distance from the victim reportedly facilitates dehumanization or objectification, and seems to make it easier to dismiss empathy for them. Gendered codes did not readily or richly emerge from this theme though the focus remains on girls and non-binary genders as victims. An example of a typifying segment in this theme: Given in response to an interview question about receiving a nude photo of someone who the participant attended school with but didn't know (compared to the victim being a friend), a Latino boy and a Latina girl both responded very similarly in their quickness, apathy, and clarity, in saying almost the exact same thing verbatim. The boy's exact quotation is here: "*Not at all like, I'd just send it.*" Another participant (girl, Black/African-American) reflected, "*...if it was just someone from school I wouldn't really feel bad I just wouldn't really care, its none of my business.*" Other representative examples of reflections include, "*they don't feel shame because they don't know the people in the photos,*" and "*they only see the person in the photograph as pornography, not as someone with feelings and emotions.*" Objectification was specifically named and coded in two segments, one by a Black/African-American girl, one by a Latino boy.

4. Victim's popularity: This code was divided into the following sub-categories to reflex a complex portrayal of popularity, social influence/capital, clout, attention, and the ways in which they are overlapping and distinct concepts in the data.

4.2 Popularity itself is irrelevant. Codes (51 segments) suggested that the popularity or influence held by the individual in the photo is not inherently motivating for others to share it. These reflections tended to be short without much detail or interpretation shared by

participants. A typifying example from one participant (girl, Asian) is: “*I feel like any photo is going to blow up. It doesn't matter.*”

4.3 Popularity is intertwined with physical attractiveness. 19 codes point to physical attractiveness being a correlate of popularity, which participants illuminated as they had difficulty teasing the two constructs apart to answer the qualitative questions specifically about social capital and popularity. For example, one participant shared, “*um I guess it doesn't really matter, as long as she's hot.*” Another shared, “*find me one popular person who isn't at least decent looking, you can't.*”

5. Participants' stable within-person beliefs that shape decision-making. This umbrella code was created to house factors that participants shared that rooted their decisions about sexting in their own beliefs, values, or characteristics rather than anything about the context in which sexting occurs.

5.1 Relationship and context irrelevant opposition to forwarding: This code was created to capture 31 segments in which participants with a diversity of identities relayed that under no circumstances, regardless of anything about person in the photo, they would not want to violate anyone's consent or cause any person harm by forwarding a sext. Examples include, “I am aware of ruining womens life by doing this, I wouldn't wish that one anyone,” and “It wouldn't be any different if it was a stranger or a close friend because sending someone's body like that without consent to someone else is wrong.”

**Aim 3. Examine the utility of a novel sexting-specific discounting task compared to the domain-general Social Discounting task.**

Popularity sext discounting across preference and popularity dimensions are correlated significantly at  $r = .75, p < .01$ . Notably, correlations are greater between modalities than across

constructs: Social and sext discounting across the preference dimension are modestly correlated at  $.30, p < .01$ . A similar trend emerged for social and sext discounting across the popularity dimension,  $r = .23, p < .01$ .

Fit indices of  $2LL$ ,  $AIC$ ,  $BIC$ ,  $SSBIC$ ,  $CAIC$ , and  $AWE$  yielded unanimous support for retaining the 4-class over the 3-class and 5-class solutions. Compared to the 3-class solution, LRT and BLRT tests were significant at  $p = .02$  and  $p > .001$ , respectively, in support of the importance of the added value in the 4-class solution compared to the 3-class solution. Compared to the 5-class solution, the LRT and BLRT tests were non-significant at  $p > .05$  for both. Additionally, the entropy value of  $.97$  in the 4-class solution suggests highly acceptable separation between classes, based on the convention that entropy of  $0.7$  typically indicates minimally acceptable separation (Nylund et al., 2007). Taken together with the meaningful interpretability of classes using Social Discounting and Peer Relations theories, the 4-class solution was retained.

Results for class means on each indicator measure can be found in Table 11 and plots in Figure 4. A note on interpretation: Outcomes range from 0 to 1, where 0 indicates a “selfish” choice (i.e., keep the money for oneself, forward a sext that victimizes person x for clout) and 1 indicates an “altruistic” choice (i.e., splitting the money with person x, not forwarding the sext that victimizes person x). So, higher means indicate less “discounting” in ascribing subjective value to the altruistic outcome, and thus, higher likelihood to make the altruistic choice. Oversimplified short-hand names are parenthetically provided as nick-names for the classes to aid reader navigation, and should not be interpreted beyond this function. Class 1 (i.e., selfish with money, altruistic with sexting) 28.0% of the sample, is characterized by very low social discounting values overall, but show a mean difference between  $S_{preference}$  ( $M = .33, SD = .35$ ) and



$S_{popularity}$  ( $M=.48$ ,  $SD=.11$ ), similar to those observed in Class 2 (i.e., slightly more selfish with money than with sexting, but more likely to protect friends than popular peers in both domains). Unlike Class 2, Class 1 shows a steep incline on sext discounting measures ( $SX_{preference}$   $M=.88$ ,  $SD=.11$ ;  $SX_{popularity}$   $M=.81$ ,  $SD=.22$ ), such that they are on par with those observed in Class 4, and the difference between  $SX_{preference}$  and  $SX_{popularity}$  is negligible. Class 2, 12.4% of the sample, shares Class 1's trends on social discounting measures ( $S_{preference}$   $M=.32$ ,  $SD=.37$ ;  $S_{popularity}$   $M=.04$ ,  $SD=.07$ ), but has a unique pattern on the sext discounting measures ( $SX_{preference}$   $M=.62$ ,  $SD=.26$ ,  $SX_{popularity}$   $M=.32$ ,  $SD=.16$ ). First, both means are substantially lower than all other class mean AUCs on sext discounting measures. Also, Class 2's  $SX_{preference}$  value is notably higher than  $SX_{popularity}$ , making them the only class to show a clear differentiation between the two sext discounting measures. Class 3 (i.e., moderately altruistic with money, very altruistic with sexting; 13.2% of the sample) is characterized by moderate AUC on the social discounting measures ( $S_{preference}$   $M=.98$ ,  $SD=.06$ ,  $S_{popularity}$   $M=.98$ ,  $SD=.04$ ) and fairly high values on the sexting measures ( $SX_{preference}$   $M=.92$ ,  $SD=.92$ ;  $SX_{popularity}$   $M=.91$ ,  $SD=.16$ ). Class 4 (i.e., very altruistic on all measures), 46.2% of the sample, yields very high means on all discounting measures, signaling very little subjective discounting of the value of the altruistic outcomes ( $S_{preference}$   $M=.31$ ,  $SD=.26$ ;  $S_{popularity}$   $M=.01$ ,  $SD=.03$ ;  $SX_{preference}$   $M=.92$ ,  $SD=.08$ ;  $SX_{popularity}$   $M=.88$ ,  $SD=.14$ ).

**Aim 4. Exploratory: What novel insights do qualitative reports yield about sexting context, perceptions, or beliefs beyond a-priori aims?**

5.2 Moralistic justification for sexting opposition. Though the study did not ask any questions related to participants' value judgements on sexting, a morality code was established and 32 segments (yielded by 26 participants) were assigned this code. This exploration stemmed

from codes in section 5: The initial question was focused on the extent to which preference and popularity affect decision-making. A trend was identified in many responses sharing that both constructs were irrelevant to their own decision-making. Within those responses, a sub-trend of moralistic justification was observed and explored. Uniformly, participants who shared extemporaneously on the topic of morality articulated a strong stance against sexting at large on similar moral and ethical bases. Examples: *“I firmly believe that sharing anything without explicit consent is sexual harassment and also one of the most humiliating and demeaning things you could do to another person,”* and *“I’m a good person so I don’t participate in things like this.”* Another example is, *“It’s never okay to spread someone’s photos especially if the person thinks they can trust you.”*

5.3 Awareness of legality. This code also resulted from exploring factors beyond popularity and preference that affect participants’ sexting decision-making. The study did not prompt participants to discuss the legal implications of sexting specifically, though six participants brought it into conversation (6 segments). For example, a Latino boy shared, *“it can lead to serious problems with the police.”* A Black/African-American boy shared, *“child pornography is illegal,”* and a bi-racial Latino and white boy shared *“When I lived in the city, there was this one dude who exposed this one girl’s nudes it was my ex then he dated her and exposed her nudes, and her mom and dad actually called the cops and that kid went to jail for a little bit for child pornography. He got booked I swear to god.”*

5.4 Perceptions of the forwarder: This code emerged from a trend (67 segments) in participants ascribing fixed personality traits to individuals who coercively seek out sexts and forward them non-consensually, particularly if there is no reason beyond self-amusement. In discussing these behaviors, answers to questions about why participants believed their peers

made those choices repeatedly attributed hurtful choices to unfavorable fixed personality characteristics. Examples include: *“it’s either revenge or narcissism,” “because people are assholes,” “they’re dumb,” “people are evil,”* and *“they’re mean and immature.”*

5.6 Interpretations of digital norms and responsibility: This code captured instances in which participants referenced a somewhat shared sense of behavior expectations in terms of exercising digital responsibility to minimize harm from sexting, and norms around swiftly managing these situations with social savvy. For example, several participants mentioned saving or screenshotting a snapchatted nude that they receive crosses the line into taking advantage of a situation (versus just opening it and letting it expire, which is a situation beyond the recipient’s control). Others name that the individual taking the photo has some responsibility to determine the trustworthiness of the recipient. Examples: *“I would delete it immediately...I be worried about and like scared because I don't want someone saying, oh, I sent it to him and he like saved it. And like make up a lie about me.”* Also, *“I feel like it's mutual up until the point where they're like save to camera roll. Yeah, where it gets to that point, whoever goes to that point is the one that's taking advantage of it, they're taking advantage. That's how you know you got screwed over. You fucked up.”*

## **CHAPTER V: DISCUSSION**

The current study applied Social Discounting Theory to conceptualize sexting behavior among high school students as a trade-off between the social capital gain from sharing the photo and foregoing it to protect a peer from further violation. Given the power of the adolescent social network in guiding decision-making, this study also explored the contributing role of popularity discounting as a contributing process. In the digital age, non-consensual sext forwarding allows for the harm caused by one consent violation to grow exponentially within minutes, and current

management strategies are a-theoretical and ineffective (Ojeda & Del Rey, 2022). This test for proof-of-concept included four specific aims: First, to clarify the ways high school students engage in sexting; Second, to test social and popularity discount rates as predictors of real-world and hypothetical sexting behavior; third, to use a novel sexting-specific choice task to compare sexting discounting specifically to domain-general social discounting processes; and fourth, to explore the unexpected meaningful themes that emerged in qualitative data analysis.

### **Aim 1. Examine current real-world sexting prevalence rates, types, and context**

A sample of 213 high school students participated in the study, and data suggest no strong patterns of sexting involvement related to identity. Modest associations suggest that in this sample, boys and white participants were more likely and girls, Latiné participants, and Bi-racial participants were less likely to forward sexts, each compared to all other levels of the respective identity. A total of 134 participants (63% of the sample) endorsed having received a sext, and 69 youth (32.4%) endorsed having forwarded a sext in the past calendar year. These findings first highlight that sexting incidence has increased substantially in since the most recently conducted meta-analysis was published in 2018 (Madigan et al., 2018), reporting that 27% had received a sext and 12% of youth had forwarded one without consent. Current rates are about double those computed five years ago. Despite the sample being limited, there is no indication that the sample selected for youth who were systematically more likely to be engaged in this behavior compared to the average adolescent. Further, the current study found that about 24% (N=51) youth had taken and sent a nude photo of themselves to a peer, compared to the 12% referenced in 2018. Additionally, findings show that most youth today are utilizing more than one social media platform, and are witnessing sexts being exchanged on multiple platforms. Regarding Discord specifically: Though Discord users were the least likely to be present on multiple platforms in

this sample, qualitative findings report that especially harmful content, such as child pornography and unwanted sexts from strangers, is relatively easily accessible and normalized on the platform.

Perhaps most interesting, self-rated popularity is significantly correlated, though modestly, with real-world forwarding behavior. A Grounded Theory analysis of qualitative data enriched interpretation of the quantitative data, and illuminated the ways sexting tends to unfold for participants in this sample. Specifically, qualitative analyses drew distinctions between the scenarios in which sexts often originate, and the scenarios in which they are shared beyond the limits of consent. According to reports from participants, sexts are often created and shared in one of four ways: within a sexual or romantic context (either consensually or coercively), via self-exposure for personal gain (e.g., money, influence), in a sensation-seeking interaction, or via incidental, ubiquitously unwanted, exposure from spam accounts or on open digital forums. Step 1 largely involves a dyadic or intimate exchange where the underlying motive appears to be much closer to what the behavior suggests at face value (e.g., wanting to promote one's photos for influence gains, seeking a nude photo from a partner for sexual/romantic purposes). In contrast, step 2 is a social process that necessitates at least one 3<sup>rd</sup> party audience member for the functional behavioral goal to succeed. The underlying motives were repeatedly and distinctly reported as the pursuit of three ends: social capital, revenge, and/or entertainment at the victim's expense (though not necessarily targeted). The other way that nude photos are often spread is via accounts established on platforms like Instagram and Snapchat for this explicit purpose: To expose and popularize photos of local adolescent girls. This phenomenon can be conceptualized as a macrocosm of the former: Though participants did not comment on motives underlying the creation of such an account, the account's existence is constantly reinforced in a feedback loop

by views and engagement from app users. Additionally, further Grounded Theory analyses synthesized participants' reactions to and beliefs about the above phenomena. Participants readily identified revenge, "flexing," and seeking amusement as primary motives for sharing a peer's nude photos without consent.

These qualitative findings from the current study highlight further cause for concern compared to Madigan and colleagues' (2018) study. Compared to 12% in the previous study, 24% of the current sample reported sending a nude photo to a peer. Though this behavior is not inherently harmful or bad, qualitative findings illuminate a very painful yet accessible pathway that poses high risk. A common way nude photos originate among this population is in the context of sexual/romantic exploration, yet the most widely identified and somewhat well-accepted motives for non-consensually leaking this content relate to two very typical social-developmental adolescent processes. Defining aspects of adolescence include shifting one's social priorities from family of origin/attaching to adults to navigating the peer network and identity development in tandem with peer relationship building (Lam et al., 2014, Ragelienė, 2016). For many adolescents, there are abundant examples each day, in-person and virtual, where they are inclined to explore seeking acceptance, attention, and/or social capital among peers, and endless opportunities to attempt conflict resolution. Increasing instances of taking nude photos, without effective scaffolding toward healthy sexual exploration and risk-mitigation, may only be increasing the odds that adolescents experience preventable harm that is more severe than the level of distress that may be helpful for social learning (Liz et al., 2020).

Further, the current findings largely support the "visual gossip" hypothesis (Johansen et al., 2019), which first suggested that the motive for sexting was not always necessarily sexual, but rather an attempt to gain social capital by placing value on "sexts" and sharing high-value

currency with others to mark oneself as a worthwhile friendship bond to invest in. Current findings robustly supported that sexts (picturing girls and femmes) are shared to prove desirability, sexual prowess, or otherwise brag to friends, mostly by boys. These findings are also consistent with Maheaux and colleagues (2020), which state that a majority of students perceive that receiving and sharing sexts is a common and desirable experience of popular students, despite this perception being unsupported. The inverse correlation between self-perceived popularity and sexting behavior is a compelling corroborating finding from the current study, which largely contextualizes that narrative as occurring among boys, and predominantly heterosexual boys based on the sample. An important extension to this area contributed by this study is that in addition to a gain-focused motive, sexts as “currency” are often weaponized to take something away from others to avenge a perceived injustice. Exploiting a peer’s vulnerable photos for revenge is not a new finding on its own, and several researchers have published useful work identifying this dynamic, and its connections to sextortion (Englander et al., 2017; Gámez-Guadix, M, Van Ouystel et al., 2017). However, the current study incorporates motives that have been identified piece-meal and observationally, into a parsimonious framework via behavioral economics. The four identified avenues for distribution suggested by the current data can be understood as interrelated socially capitalistic processes (Glaeser et al., 2002): If the motivation is to gain capital in a (perceived, contrived) zero-sum paradigm, logic follows that it must come at the expense of others.

**Aim 2. Examine social discounting of preferential and popular peers as a predictors of real-world self-reported sexting behavior.**

Social discount rates on the preference dimension predict whether or not an individual will forward a sext substantially better than change on the hypothetical and self-reported

measures. Social discounting rates on the popularity dimension were highly correlated with the those on the preference dimension. While they performed comparably on predicting the real-world outcomes, they did not predict hypothetical outcomes any better than chance. The preference-based social discounting task has been robustly validated and deeply rooted in theory (Sharp et al., 2012; Jones & Rachlin, 2008), whereas the popularity-based adaptation is an entirely novel extension. First, regarding the social discounting findings: the largely orderly data confirm that young people are in fact engaging in systematic, social discounting processes. Thus, this framework is useful for studying sexting behavior, but contributes to the collective knowledge base of Social Discounting as a construct or process. The person-specific rate at which high school students subjectively discount the value of altruistic behavior as a function of social distance from the individual is capturing a systematic process that predicts, substantially better than chance, whether or not they will non-consensually forward a sext. Qualitative analyses align with the quantitative results signaling that subjective discount rate often facilitates sexting decisions, and that closeness with the victim may temper an intention to share it with others. When the person in the photo was a girl or femme-presenting person, participants readily referred to her as a victim, and robustly responded that they had or would take action to protect her or act in her best interest if she was a friend, and likely remain apathetic or care without acting if they did not know her. In contrast, boys whose sexts were leaked were not discussed as “victims” in the qualitative interviews. Rather, it seems that discomfort addressing a vulnerable situation, perhaps socialized through masculinity or heteronormativity (Marchia & Sommer, 2019), is activated when heterosexual boys are faced with their own or a peer’s non-consensually shared nude photos. Berndtsson (2022) also identified this phenomenon in her work, finding that the way sexting topics were typically navigated (i.e., by making jokes, ignoring it) boys’



discomfort and lack of skill development prevented honest discussions. Her findings suggest that these norms facilitate loneliness and hinder the positive experiences that come with sometimes uncomfortable vulnerability, and make it harder (for the boys themselves, and those around them) to detect and address true pain or sexual abuse if it were to happen. Setty (2020) found that boys were subject to peer ridicule related to the appearance of their genitals, in the event that a dick pic surfaced. Several responses in the current data under the code “Relationship and context irrelevant opposition to forwarding” acknowledged the harm that could come to women specifically. Taken together, the collective narrative appears to believe that women can be more harmed and are thus victims and deserve empathy for their hurtful experiences. Denying boys the permission to be equally “grossed out” when they receive an unwanted sext (rather than exercise compulsory heterosexuality), and be hurt if they are victimized, also denies them the opportunities to connect, receive care, and mutually humanize each other. While the quantitative evidence documents systematic discounting at play, questions remain regarding the shaping of that process with regard to internalized and external biases.

Second, the popularity-focused discounting task yielded fairly systematic data as well, signaling the presence of some systematic process. The high correlation between measures may indicate that the popularity-focused task was not sufficiently different from the original task, and was perhaps just picking up lower signal and more noise in exercising the same mechanism. However, the qualitative findings related to popularity, specifically regarding its strong correlation with conventional physical attractiveness, and the highly gendered nature of sexting dynamics, complicate the hypothesis that a photo of a popular peer increases the value of the sext. The girls whose photos were repeatedly posted to highly-followed public accounts were not interested in this form of popularity, and the girls exploring using their nude photos for personal

gain (e.g., influencer work on social media, payment for content are both gaining traction as a result of internet attention (i.e., a definition some would argue fits for popularity), though one is an intentional path and the other is a massive consent violation. Taken together, it seems that the sender's motivation to become known or popular may be at play (e.g., in promoting oneself for gain, engaging in sexting) but in several ways not anticipated by the initial hypothesis. The role of popularity appears to be about the forwarder, their perceptions and motivations, and whoever they are sending it to, rather than the individual in any one photo. Returning to the social capital hypothesis, it appears that the value of the token is pretty un-changeable and irrelevant though one's motivation to use it more strongly shapes the behavior.

**Aim 3. Examine the utility of a novel sexting-specific discounting task compared to the domain-general Social Discounting task.**

Comparing the established domain-general social discounting task to a novel sexting-specific adaptation, sought to test for added value conferred by a more closely ecologically valid task compared to the original global measure. Scores were compared to Social Discounting analogs, and significant correlations (i.e.,  $S_{preference}$  correlated with  $SX_{preference}$ ;  $S_{popularity}$  correlated with  $SX_{popularity}$ ) demonstrated some level of convergence. However, as previously discussed, correlations between both versions of each task were slightly stronger than the between-task comparisons, in contradiction to the initial hypothesis. Importantly, the global social discounting process must inherently diverge from the way it manifests in sexting decisions, as the latter is still related to sex. Qualitative findings demonstrate that many individuals are staunchly opposed to forwarding a sext whatsoever, are concerned about the legalistic aspects, or cite other contextual factors shaping this decision-making process. Comparatively, the original Social Discounting task trials are operationalized using a choice between an unanticipated dollar

amount versus a greater dollar amount, as currency is highly fungible and ubiquitously highly valued. A frame not considered a-priori is the ways in which cognitive processes differ regarding potential gains and loss anticipation (McGraw et al., 2010). McGraw and colleagues observed elevated aversion in tasks when a paradigm facilitates direct gain-loss comparison, versus decreased aversion in tasks that encourage loss-loss comparison. The structure of potential gains and losses in the sexting and social discount tasks may offer insight into re-calibrating expected differences between social and sexting discounting rates.

The novel task yielded data somewhat less systematic than hypothesized. A latent profile analysis provided a person-centered approach to illustrate within-person trends in how these constructs (ie.,  $S_{preference}$ ,  $S_{popularity}$ ,  $SX_{preference}$ ,  $SX_{popularity}$ ) relate to one another. Four latent profiles emerged, each one best-fitting for between 12% and 42% of the sample. The most populated latent profile is characterized by scores indicating highly altruistic choices across all four measures (Class 4). The others include an overall moderately altruistic profile (Class 3) where the social discounting scores are similar and somewhat lower than sext discounting scores, which are also similar to each other. The two remaining classes yield the least altruistic scores on the social discounting measures, though preference is markedly higher than popularity discounting for both. In the sexting domain, one class yields highly altruistic scores (Class 1), whereas the others' remain in the moderate range (Class 2). One-hundred fifty-eight participants (of N=213) endorsed forwarding a sext in the last calendar year, and while they were distributed across all latent classes, Class 2 was comprised entirely of sext-forwarders and Class 3 had a very low proportion. Notably, Class 2 yielded very low values, and  $S_{popularity}$  and  $SX_{popularity}$  in particular. Taken together with both popularity discount rates being the strongest predictors of sexting behavior, the data suggest that the popularity of the individual in the photo is irrelevant,

but the attunement to popularity is projected onto the situation by the forwarder. Also, comparing Classes 1 and 2, their S values are similar, with the greatest difference being that Class 1 is way less likely to engage in sexting, despite global S values akin to those in Class 2. This comparison seems to reflect a difference in aforementioned factors that shape sexting decisions, such as ones moral compass or intention to avoid prison.

**Aim 4. Exploratory: What novel insights do qualitative reports yield about sexting context, perceptions, or beliefs beyond a-priori aims?**

Finally, the current study committed to the possibility that the Grounded Theory analysis would illuminate unexpected findings worthy of exploration and inclusion. Codes related to a common moral framework that did not condone sexting, perceptions of the sender, awareness of legal implications of sexting, and the digital interaction norms and responsibilities cited by participants were synthesized in connection with all other findings. These findings demonstrate the responsibility that youth are assuming in learning how to navigate constantly difficult choice-points in unregulated dynamics with unclear norms. Returning to the construal level frame, a unique challenge of adolescence currently is shifting between the online world, the external world, and their internal world. They are navigating the developmental tasks of adolescence, though doing so utilizing data from multiple realities (Granic et al., 2020). Non-consensual sexting overall is evidence of adolescents bringing their real-world distress or motives into their digital interfaces. These codes, however, also offer evidence that adolescents are continuing to develop off-line and are also bringing the positive skills they're building in those spaces to harness in digital decision-making (Nesi et al. 2020).

**General Discussion, Limitations, and Future Directions**

Synthesizing findings across aims bolsters several key connections among the data. Returning to the functional behavior perspective (Skinner, 1953; Roscoe et al., 2010; Vollmer et al., 2019), this study demonstrated that gaining social capital, in the form of attention from a social network at a peer's expense, underlies the primary motives observed in secondary, non-consensual, sexts. With this context, it is thereby unsurprising that Latent Class 2, predominantly white cisgender boys, yields very low discounting rates on average, suggesting that members with this profile have a fairly high threshold regarding for whom they will sacrifice personal gain and act altruistically, and the entirety of this latent class has forwarded sexts non-consensually. They have the lowest perceived mean popularity self-rating, and are ostensibly attempting to gain social standing in the network (Sidanius & Pratto, 2001).

Concurrently, the sample at large produced a theme in qualitative data which ascribes fixed, undesirable, personality characteristics to individuals who share sexts non-consensually. This finding contrasts with the report that sexting is an attempt to gain social standing. Based on qualitative reports shared in the study, the majority of the sample is not likely to think more highly of a peer who non-consensually shares nude photos of another peer. In other words, if the sample does not think highly of this behavior, why do students continue to engage in it in hopes of experiencing a bump in reputation? Similarly, the sample overwhelmingly shared empathy and respect for girls and non-binary students who were victims. If the goal of exploiting an individual's nude photos is to humiliate them and damage a reputation, the reinforcement loop does not appear to be functioning in accordance with this perception. Are these discrepancies best conceptualized as social desirability bias coming into play during the interviews, and dissuading participants from identifying with the "bad" role (Fisher & Katz, 1999), such that they over-corrected and failed to humanize a position that 158 have found themselves in before?

Alternatively, do the individuals in Class 2 represent a subset of the sample whose actions either are being reinforced, or are not being rewarded for their behavior, but are not sufficiently responsive to behavioral learning as to shift their approach? If this is the case, psychoeducation, or an intervention such as attentional bias training may help identify more effective strategies toward fulfilling peer relationships.

Situating the functional behavior perspective within a social ecosystem, a preponderance of data likens sexts to currency trade. Economic theory can be used to extrapolate and provide a broader mechanistic understanding. Resource allocation during scarcity conditions is a long-studied paradigm (Polasky et al., 2019). When resources are scarce, or perceived to be scarce, a learning history shaped by capitalism systematically conditions resource hoarding as an adaptive response (Polasky et al., 2019; Huijsmans et al., 2019). This response hinges on the assumption that resources are finite and the paradigm is a “zero sum” game, such that there must be winners at the expense of the losers (e.g., Chowdhury, 2019). Hoarding is an over-corrective response to this fear which only creates a self-fulfilling prophecy where guarding excess unused resources provides a false temporary sense of comfort, prevents others from using them as well, and reinforces belief in the cycle (Goldsmith et al., 2020; Ryland et al., 2022). Placing these concepts in terms of social capital (Glaeser et al., 2002), it follows that a perceived threat to one’s “resources” (i.e., social standing etc.), may trigger the attacking response in an effort to take perceivably finite social resources from another person and guard them for oneself is helpful for understanding this behavior, especially in attempting to make sense of and collectively support communities who have been raised under late-stage capitalism in the US. Moreover, scholar-activist/writer bell hooks has delineated the ways in which the US economic framework best characterized as the “imperialist white supremacist capitalist patriarchy” (hooks, 2004, p17)

infiltrates every aspect of culture and lives. The practice of forcibly enslaving humans gave rise to a society centered on normalized domination and dehumanization, which affects every person, though uniquely based on how the interlocking systems of oppression interact with each other, and upon their composite identity (Crenshaw, 1989). In the introduction to her handbook, “Feminism is for Everybody: Passionate Politics,” bell hooks wrote, “In return for all the goodies men receive from patriarchy, they are required to dominate women, to exploit and oppress us, using violence if they must to keep patriarchy intact. Most men find it difficult to be patriarchs” (hooks, 2000; p.ix). This statement reflects the disconnects between motives and values expressed by numerous participants in this sample. Situating a digitally-advanced form of interpersonal violence within the context of the history of the systems and people that contributed to its creation obviates why social interaction is so readily comparable to economic theory. It follows that frameworks for interpretation and reimagination established by those most economically oppressed and radically dedicated to collective liberation can also serve as blue prints applied to the microcosm of this dynamics embodied in interpersonal violence among adolescents.

The current study was limited in several ways, and results should be interpreted cautiously with these considerations in mind. First, the number of participants and the limitations of convenience sampling. While the sample is fairly diverse on several dimensions, and there is no known systematic bias in sampling, readers should exercise caution in attempting to generalize findings to all youth. Further, the study team was also limited in the lived experienced perspectives it could apply, given that the PI and CL are cisgender white women with educational privilege. However, both are dedicated to theoretical and practical embodiment of anti-oppression pedagogy. Additionally, while the data include both self-reports and behavioral

measures, this study was unable to ultimately capture social network data. Network data would allow for examining each individual through the lens of their peers, and in terms of how they are situated socially. This level of measurement may have been able to provide insight on the degree to which social desirability bias is played in self-reports. Additionally, the tasks intended to capture popularity discounting and sex discounting are both entirely novel. While theoretically justified, this study did not conduct preliminary validation or measurement studies prior to the current one, creating limitations for these measurement tools.

. From a measurement perspective, these data support social discounting choice-paradigm discounting tasks as a feasible option for youth, and their virtual adaptability. A wider implication is encouragement for researchers to creatively explore ways to use and adjust these tasks in their domains of interest. Choice tasks yield behavioral data which offers a complement to self-reported data in increased ecological validity and some protection against low-insight, memory issues, or social desirability biases in studying individual behavior (Matta et al., 2012). Importantly, this study was intended to study a basic social process, and ideally yield sturdy building blocks upon which to create sustainable and effective interventions. As such, it does not justify immediate use of social discounting paradigms to screen for potential future violence. However, it does represent a theoretically grounded step toward re-organizing preventative approaches to interpersonal violence between peers. Future work should consider building a sufficiently nuanced understanding of the overlapping constructs labeled popularity, and the trends in roles it plays in motivating student social behavior. Additionally, continuing to build clarity on the seemingly domain-general social discounting process, how it fluctuates with state-level changes, and interactions with culture and identities may inform sustainable future structural change. Moreover, the study of sexting was intended to serve as somewhat of a test-



behavior for applying social discounting to relational aggression among adolescents. Future work should continue to explore the applicability of the Social Discounting theory to behavior that systemically creates disconnection, rugged individualism, and greed. A theoretically grounded understanding of an important psychological process could enhance the sustainability of structural change and interventions.

Moreover, acute intervention is needed by adults, policy makers, and tech companies to prevent exploitation of youth on social media platforms. Platforms may be better able to impose algorithmic or content/user-level policy if they are able to de-couple their profits (and the profits of users monetizing their content on the platform) from exploitative content (Heller & Dance, 2019). Further, complex trauma related to this form of violence can be prevented by the federal and state legal systems by removing child pornography penalties for children (Westlake, 2018) in favor of ensuring evidence-based trauma-focused or informed supports (Slade et al., 2016; Cohen et al., 2017).

Overall, social discounting and sexting discounting data demonstrated that youth are guided by a lawful thinking and making decisions regarding sexting behavior guided by a framework that balances competing priorities (i.e., social capital versus values-consistent action). Moreover, this finding converges with others in which social discounting measures have captured the process underlying a social behavior (e.g., verbal disruptions to a group, prosocial intervention in a cyberbullying incident), furthering the evidence of a domain-general quality underpinning all of these behaviors (Hayshi & Tahmasbi, 2021; Sharp et al. 2012). Additionally, these results signal applicability to other social decision-making domains. Overall, these data may provide a helpful basis upon which to build insight and solutions, as youth in this sample are already doing.X

**Table 1***Participant Identities: Grade and Age*

Grade in School	N
9 <sup>th</sup>	84
10 <sup>th</sup>	32
11 <sup>th</sup>	36
12 <sup>th</sup>	61
Age <i>M</i>	16.01
Age <i>SD</i>	1.55

**Table 2***Participant Identities: Sexual and/or Romantic Orientation*

Aromantic	Asexual	Bisexual	Gay	Lesbian	Not sure	Pansexual	Queer	Straight/ heterosexual
0	2	28	4	5	7	1	2	168

**Table 3***Participant Identities: Gender*

	Agender or gendervoid	Another gender identity	Boy	Genderfluid	Girl	Non- binary	Trans or transgender	Unsure
Agender or gendervoid	1	-	-	-	-	-	-	-
Another gender identity	0	1	-	-	-	-	-	-
Boy	0	0	131	-	-	-	-	-
Genderfluid	0	0	0	3	-	-	-	-
Girl	0	0	2	0	72	-	-	-
Non-binary	0	0	-	0	0	0	-	-
Trans or transgender	0	0	1	0	0	1	0	-

Unsure	0	0	0	0	0	0	0	1
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**Table 4**  
*Participant Identities: Ethno-Racial Identity*

	Asian (including Southeast Asia, and middle- eastern asia)	Black/African- American	Indigenous or Native- American	Latiné or Hispanic	Pacific Islander/Native Hawaiian	Caucasian/White
Asian (including Southeast Asia, and middle- eastern asia)	11	-	-	-	-	-
Black/African- American	0	16	-	-	-	-
Indigenous or Native- American	1	0	1	-	-	-
Latiné or Hispanic	3	1	2	59	-	-
Pacific Islander/Native Hawaiian	0	0	0	0	0	-
Caucasian/White	3	1	0	6	0	76

**Table 5.**  
*Participant identities: Socio-Economic Status*

SES description	Number endorsed	% of sample
Money is not a problem for my family right now, we have some extra income but not a whole lot	50	23.5
Money is tight but we're able to cover basic needs	43	20.2
We often do not have enough money to cover our needs	5	2.3

Money is not a problem for my family, and we always have extra to save, spend, or donate however we wish to	29	13.6
Not sure, I would rather not say, or did not respond to the question	86	40.4

**Table 6.**  
*Participant Identities: Language(s) Spoken at Home*

Language spoken at home	N
Arabic	8
Czech	1
English	169
French	1
Spanish	29
Polish	12
Vietnamese	1
More than one of the above	15
Immigrated to the US during lifetime	7

**Table 7.**  
*Participant Identities: Disability*

Do you have a mental, emotional, or physical disability, impairment, or difference?		
	N	%
Yes	16	7.5
No	175	82.2
I prefer not to answer	10	4.7
I am not sure	11	5.2
No response	1	0.5
Disabilities self-reported		
	N	%
GAD or another anxiety disorder	8	3.75
Adjustment Disorder	1	.50
Attention-Deficit /Hyperactivity Disorder	5	2.35
Chronic Pain Disorder	1	.50
Fibromyalgia	1	.50

Hearing loss	2	.93
Depressive or other mood disorder	5	2.35
Reproductive health issues	1	.50
Post-Traumatic Stress Disorder (PTSD)		
Type 2 Autoimmune Hepatitis	1	.50

**Table 8.**  
*Participant Identities: Religion and/or Spirituality*

Religious and/or Spiritual Practice	N	%	Average importance (M)	Average importance (SD)
Agnostic	7	3.3%	7.57	11.03
Another	13	6.1%	56.92	31.03
Atheist	20	9.4%	6.60	11.95
Buddhist	4	1.9%	69.25	10.34
Christian	107	50.2%	55.81	31.60
Hindu	3	1.4%	47.50	30.41
Jewish	6	2.8%	30.33	22.61
Muslim	21	9.9%	74.32	28.19
Spiritual non-religious	23	10.8%	31.17	22.43
Missing	9	4.2%	-	-

**Table 9.**  
*Descriptive Statistics and Pearson Correlations among Discounting Measures and Self-Reported Sexting Behavior*

	1. Popularity Self-Rating	2. $S_{\text{preference}}$	3. $S_{\text{popularity}}$	4. $SX_{\text{preference}}$	5. $SX_{\text{popularity}}$	6. Received any sexts in the past year?	7. Number of sexts received in the past year	8. Forwarded to at least one other person in the past year?	9. Proportion of received that participant forwarded in the past year
<i>M</i>	32.53	.65	.52	.88	.82	.63	4.62	.44	.27
<i>SD</i>	26.09	.38	.45	.17	.25	.48	8.023	.50	.34
Min.	0	.00	.00	.05	.04	0	0	0	0
Max.	83	.99	.99	.99	.99	1	40	1	1
1	-	-	-	-	-	-	-	-	-

2	-.59**	-	-	-	-	-	-	-	-
3	-.62**	.83**	-	-	-	-	-	-	-
4	-.19**	.30**	.23**	-	-	-	-	-	-
5	-.27**	.27**	.33**	.75**	-	-	-	-	-
6	.41**	-.35**	-.40**	-.23**	-.32**	-	-	-	-
7	.34**	-.28**	-.30**	-.28**	-.34**	.44**	-	-	-
8	.22**	-.09	-.24**	-.45**	-.66**	.28**	.35**	-	-
9	.19*	-.32**	-.33**	-.54**	-.50**	-.19**	.12	.46**	-

Note: \*  $p < .05$ , \*\*  $p < .01$

**Table 10**

*Associations between discount rates ( $S_{preference}$ ,  $S_{popularity}$ ) and sexting behavior (self-reported, hypothetical)*

Model	AUC	SE	p-value
1	.81	.07	.001
2	.69	.05	.001
3	.51	.07	.901
4	.50	.06	.923
5	.61	.05	.025
6	.64	.04	.003

**Table 11.**

*Means Comparison on Indicators across Latent Profiles Based on Most Likely Class Membership*

	Latent Class	Social Discounting— Preference	Social Discounting--- Popularity	Sext Discounting – Preference	Sex Discounting – Popularity	One-way ANOVA (F)	Sig.
1	N	28	28	28	28	139.32	<.001
	Mean	.55	.48	.88	.81		
	SD	.35	.11	.11	.22		
2	N	25	25	26	26	624.97	<.001
	Mean	.32	.04	.62	.32		
	SD	.34	.07	.26	.16		
3	N	98	97	97	96	37.01	<.001
	Mean	.98	.98	.92	.91		
	SD	.06	.037	.13	.16		
4	N	60	60	60	60	92.59	<.001
	Mean	.31	.01	.92	.88		

	SD	.26	.03	.08	.14
Total N		211	210	211	210
	<i>M</i>	.65	.52	.88	.82
	<i>SD</i>	.38	.45	.17	.25

**Table 12**

*Participants' Identities and Sexting History by Latent Profile*

	Latent Profile			
	1	2	3	4
Asexual	0	0	1	1
Bisexual	3	3	17	4
Gay	0	1	1	2
Lesbian	0	1	0	4
Not sure	0	1	6	0
Pansexual	0	0	0	1
Queer	0	0	1	1
Straight/Hetero	25	20	73	50
Disabled	1	0	8	6
Gendervoid	0	0	1	0
Another gender	0	0	1	0
Boy	21	19	49	45
Male ASAB	19	20	49	47
Genderfluid	0	0	3	0
Girl	8	7	43	15
Female ASAB	9	6	49	13
Non-binary	0	0	0	1
Transgender	0	0	1	1
SES—highest on scale	9	5	2	13
SES—second highest	9	7	7	27
SES—basic needs met	9	12	5	17
SES—not enough to meet basic needs	1	1	1	2
Asian	3	0	8	7
Black/African-American	3	3	5	6
Indigenous/Native American	0	1	3	0
Latíné	2	2	51	15
White	23	20	45	37
Biracial	3		13	5
Agnostic	0	0	4	5
Another religion or spirituality	1	0	11	1
Atheist	2	2	10	6
Buddhist	2	1	1	0
Christian	18	17	40	33
Hindu	0	0	1	2
Jewish	1	0	1	4

Muslim	2	3	12	4
Spiritual-non-religious	1	3	14	4
Received at least one sext in the last calendar year	24	25	40	44
Sent one or more sext of oneself in the last calendar year	9	19	6	17
Forwarded at least one sext in the last calendar year	12	25	6	26

**Table 13.**  
*Pearson Correlations among Discounting Measures and Self-Reported Sexting Behavior .*

1. Popularity Self- Rating	2. $S_{preference}$	3. $S_{popularity}$	4. $SX_{preference}$	5. $SX_{popularity}$	6. Received any sexts in the past year?	7. Number of sexts received in the past year	8. Forwarded to at least one other person in the past year?	9. Proportion of received that participant forwarded in the past year
1	-	-	-	-	-	-	-	-
2	-.59**	-	-	-	-	-	-	-
3	-.62**	.83**	-	-	-	-	-	-
4	-.19**	.30**	.23**	-	-	-	-	-
5	-.27**	.27**	.33**	.75**	-	-	-	-
6	.41**	-.35**	-.40**	-.23**	-.32**	-	-	-
7	.34**	-.28**	-.30**	-.28**	-.34**	.44**	-	-
8	.22**	-.09	-.24**	-.45**	-.66**	.28**	.35**	-
9	.19*	-.32**	-.33**	-.54**	-.50**	-.19**	.12	.46**

Note: \*  $p < .05$ , \*\*  $p < .01$

**Figure 1**

*Visualization of Who has Forwarded a Sext and their Perceptions of the Person in the Most Recent Forwarded Photo—*

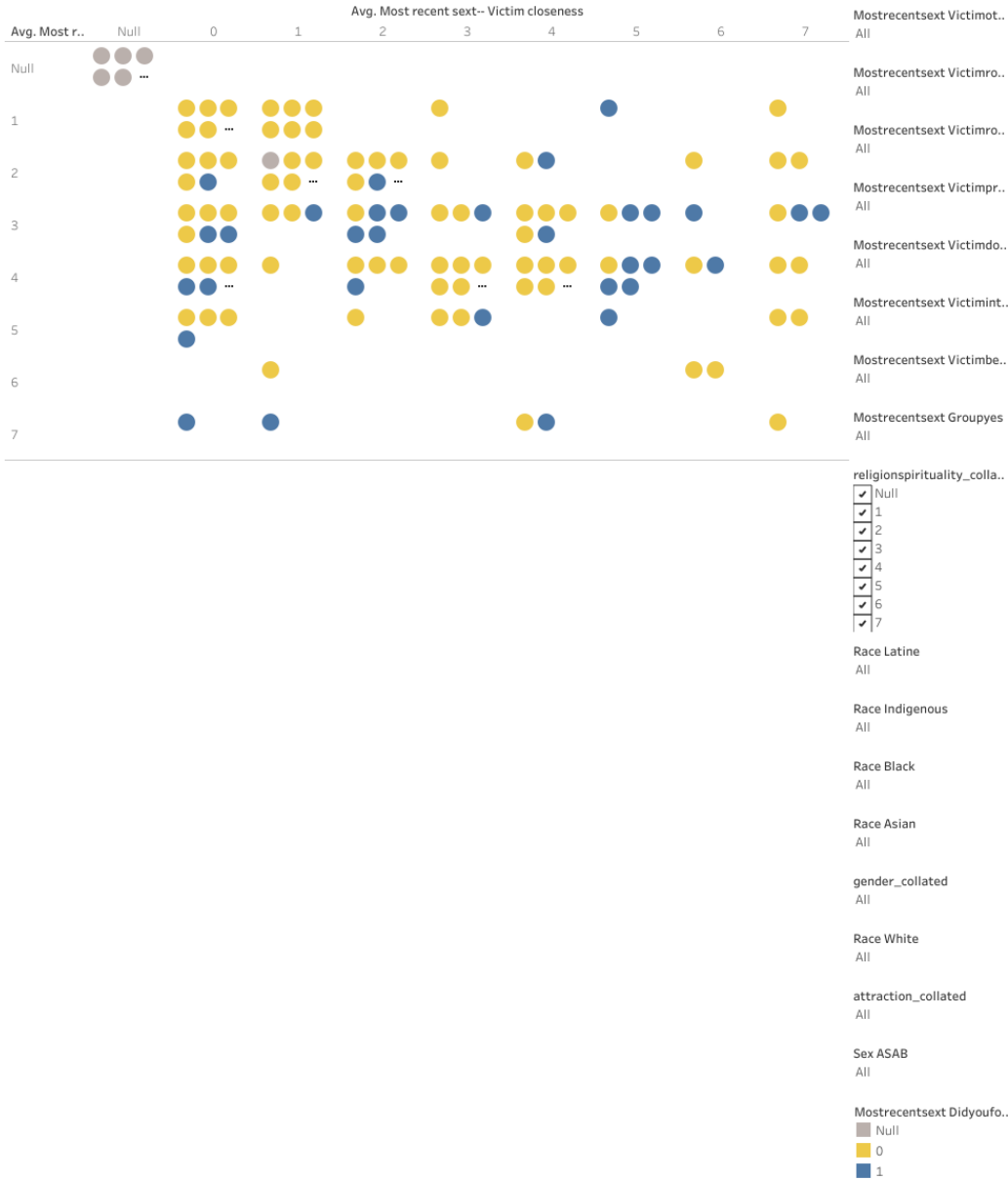
*Interactive Visualization available here:*

[https://public.tableau.com/views/platforms\\_16777035211420/Story2?:language=en-US&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/platforms_16777035211420/Story2?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link)



## Visualizing who is non-consensually forwarding sexts and their perceptions of the person in the most recent photo forwarded

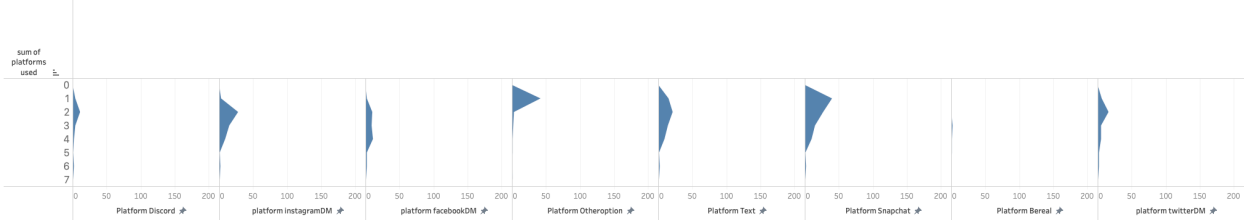
Participants were asked to think about the most recent time they non-consensually forwarded a sext to at least one other person. The x-axis represents how close participants felt to the person in the photo (0 to 7, where 7 is very close), and the y-axis represents how popular they perceived the person in the photo to be (1 to 7, where 7 is very popular).



**Figure 2**

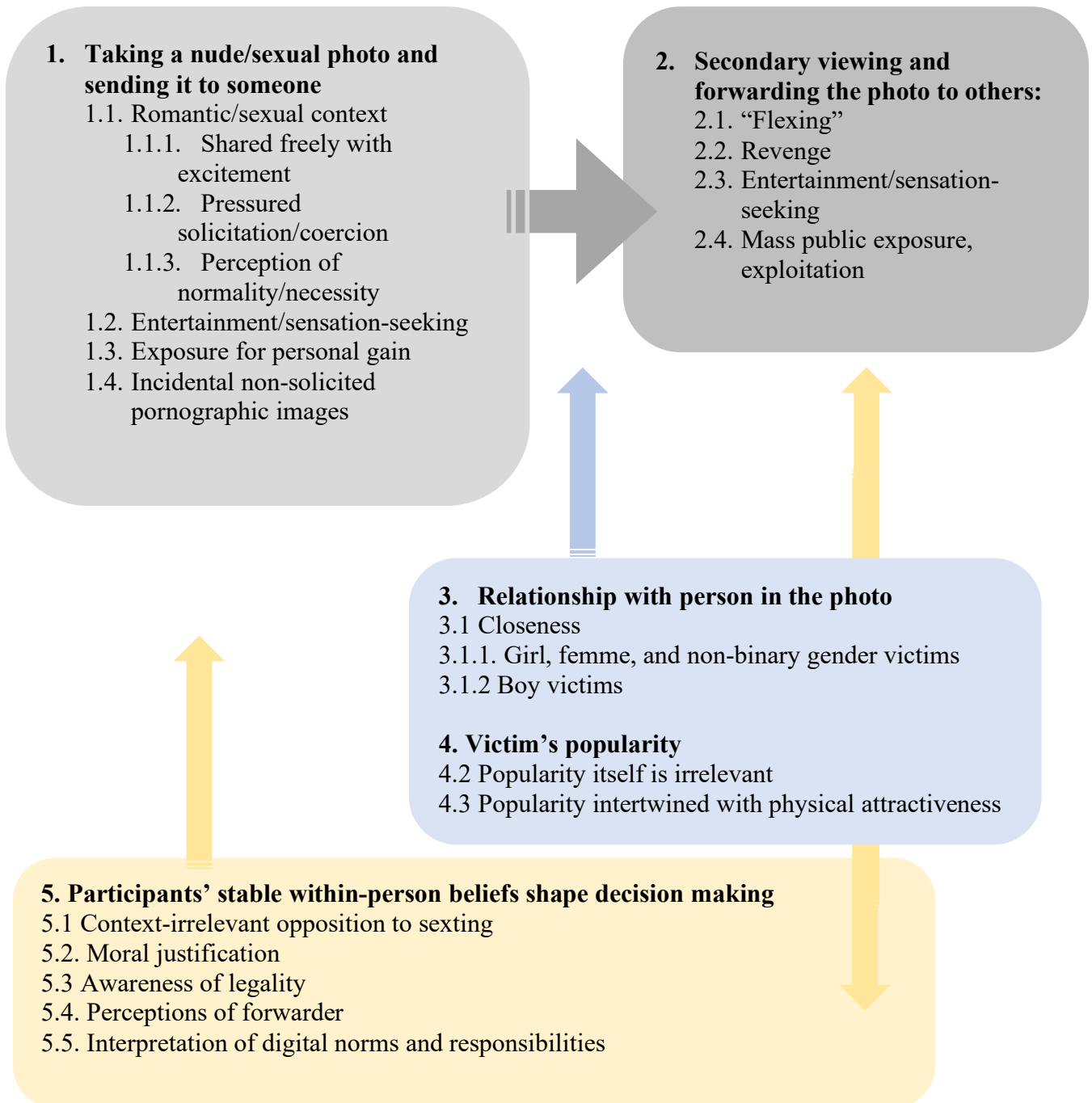
Number and Names of Platforms Used to Send and Receive Sexts—Interactive Visualization  
 Available here: [https://public.tableau.com/views/platforms1/platforms?:language=en-US&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/platforms1/platforms?:language=en-US&:display_count=n&:origin=viz_share_link)

On which platforms have you sent, received, or forwarded nudes/sexts?

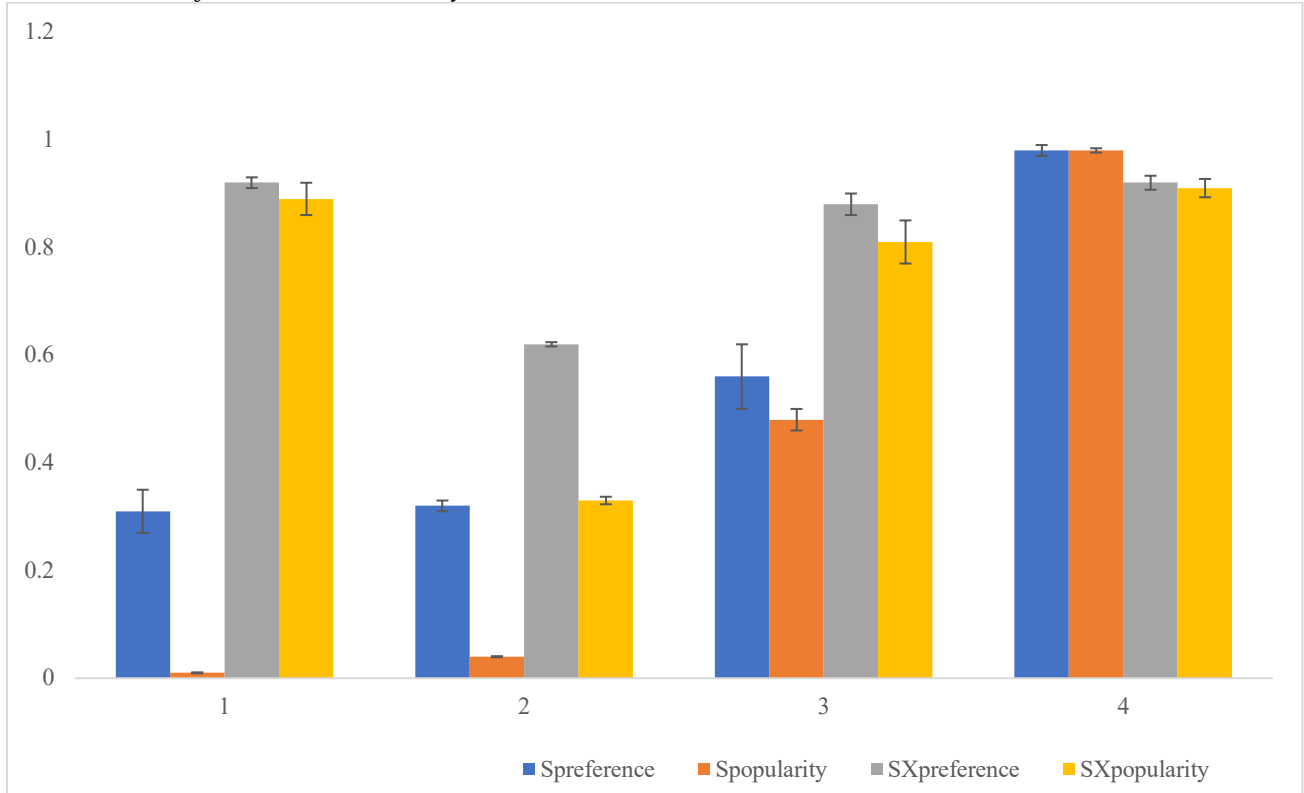


**Figure 3**

*Visual Representation of Associations between Qualitative Codes*



**Figure 4**  
*Visualization of Indicator Means by Latent Class*



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