Assessment of Sexual Violence Risk Perception in Men Who Have Sex With Men: Proposal for the Development and Validation of “G-Date”

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Abstract

Background: Sexual violence (SV) is a significant problem for sexual minorities, including men who have sex with men (MSM). The limited research suggests SV is associated with a host of syndemic conditions. These factors tend to cluster and interact to worsen each of the other conditions. Unfortunately, while much work has been conducted to examine these factors in heterosexual women, there is lack of research examining MSM, especially their ability to perceive the potential for SV risk. Further, MSM are active users of dating and sexual network (DSN) apps and this technology has demonstrated usefulness for creating safe spaces for MSM to meet and engage partners. However, there is mounting data demonstrating that DSN app use is associated with increased risk for SV, especially given the higher likelihood of using alcohol and other drugs before sex. On the other hand, some researchers have demonstrated that DSN technology can be harnessed as a prevention tool for HIV; unfortunately, no such work has progressed with regard to SV.

Objective: The current project uses qualitative and quantitative methods to tailor an existing laboratory analogue of SV risk perception for MSM. This paradigm will be subjected to a rigorous validation study to confirm its usefulness in predicting risk for SV, with the potential for use in future prevention endeavors.

Methods: For Aim 1, a team of computer scientists created the initial DSN app (“G-Date”) and incorporated ongoing feedback about the usability, feasibility, and realism of this tool from a representative sample of MSM. We used focus groups and interviews to assist the development of the G-Date app, including identifying relevant stimuli for the app, development of the cover story, and establishment of the appropriateness of study language. For Aim 2, we are conducting an experimental study with online and face-to-face participants to determine the content, concurrent, and predictive validity of the G-Date app. In short, we will evaluate whether certain correlates of SV (e.g., history of SV, alcohol and drug use) affect the ability of MSM to detect risk for SV within G-Date and how paradigm engagement connects to behavior in actual DSN app use contexts.

Results: This study received funding from NIAAA on September 10, 2020 and ethical approval was received on October 19, 2020 and we began qualitative data collection for Aim 1 in February 2021. After an iterative approach to app development, we began data collection for the Aim 2 validation study in December 2022. Initial results from the validation study are expected to be available after June 2025.

Conclusions: It is hoped that G-Date will enhance our understanding of factors associated with SV risk, and serve as a useful step in creating prevention programs for this susceptible population.

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Grant Proposal

Assessment of Sexual Violence Risk Perception in Men Who Have Sex With Men: Proposal for the Development and Validation of "G-Date"

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Abstract

Background: Sexual victimization (SV) is a significant problem for sexual minorities, including men who have sex with men (MSM). The limited research suggests SV is associated with a host of syndemic conditions. These factors tend to cluster and interact to worsen each of the other conditions. Unfortunately, while much work has been conducted to examine these factors in heterosexual women, there is lack of research examining MSM, especially their sexual violence risk perception. Further, MSM are active users of dating and sexual networking (DSN) mobile applications (apps) and this technology has demonstrated usefulness for creating safe spaces for MSM to meet and engage partners. However, there is mounting data demonstrating that DSN app use is associated with increased risk for SV, especially given the higher likelihood of using alcohol and other drugs before sex. On the other hand, some researchers have demonstrated that DSN technology can be harnessed as a prevention tool for HIV; unfortunately, no such work has progressed with regard to sexual violence.

Objective: This study 1) uses qualitative and quantitative methods to tailor an existing laboratory paradigm of sexual violence risk perception in women to be used for MSM using a DSN mobile app framework and 2) will subject this novel paradigm to a rigorous validation study to confirm its usefulness in predicting SV, with the potential for use in future prevention endeavors.

Methods: In order to tailor the paradigm for MSM, a team of computer scientists created the initial DSN app (“G-Date”) and incorporated ongoing feedback about the usability, feasibility, and realism of this tool from a representative sample of MSM. We used focus groups and interviews to assist the development of the G-Date app, including identifying relevant stimuli, development of the cover story, and establishment of the appropriate study language. With regard to confirming the paradigm’s usefulness, we are conducting an experimental study with online and face-to-face participants to determine the content, concurrent, and predictive validity of the G-Date app. In short, we will evaluate whether certain correlates of SV informed by syndemics and minority stress theories (e.g., history of SV, alcohol and drug use) affect the ability of MSM to detect sexual violence risk within G-Date and how paradigm engagement connects to behavior in actual DSN app use contexts.

Results: This study received funding from the National Institute on Alcohol Abuse and Alcoholism on September 10, 2020 and ethical approval was received on October 19, 2020 and we began app development for Aim 1 immediately thereafter. We began data collection for the Aim 2 validation study in December 2022. Initial results from the validation study are expected to be available after December 2025.

Conclusions: It is hoped that G-Date will enhance our understanding of factors associated with sexual violence risk and serve as a useful step in creating prevention programs for this susceptible population.

Assessment of Sexual Violence Risk Perception in Men Who Have Sex With Men: Proposal for the Development and Validation of "G-Date"

Introduction

Sexual victimization (SV) includes any nonconsensual oral, anal, or vaginal contact and/or penetration in which the perpetrator uses force, intimidation, coercion, or other means (e.g., purposeful intoxication) to impose sexual contact [1]. SV is an umbrella term that encompasses a variety of experiences (e.g., sexual assault, rape) between strangers, relatives, acquaintances, or intimate partners [2]. National surveys indicate lifetime SV prevalence rates of ~20% for penetrative and 44% for non-penetrative SV in women and 2% for penetrative and 23% for non-penetrative SV in men [3–5]. While much of the literature focuses on heterosexual individuals, SV is more prevalent among sexual minorities, including men who have sex with men (MSM) [6–8]. Estimates of lifetime SV range considerably according to definitions and samples, with between 26% and 67% of MSM reporting such experiences [9]. Further, intimate partner violence (IPV), which often includes or is associated with SV [10,11] is also highly prevalent among MSM with victimization rates upwards of 33% [12]. Finally, alcohol use by the victim, perpetrator, or both is a common risk factor noted across studies [13].

The prevalence of SV among MSM is not surprising given that sexual minority men experience a clustering of challenging conditions. Syndemics theory posits that negative social conditions cluster and interact to worsen each of the other conditions [14,15]. In fact, SV is associated with a range of other syndemic conditions, including substance use, mental health disorders, IPV, sexual compulsivity, sexual risk behavior, and HIV transmission [7,16–22]. Likely a common basis for many psychosocial syndemic conditions in MSM [23], minority stress theory posits that the expectations for, experiences of, and internalization of discrimination and prejudice contribute to health disparities and outcomes [23–26] including SV [27,28]. In fact, minority stress is consistently associated with a variety of syndemic conditions, such as alcohol and other drug use

[29,30] and SV or IPV [13,18]. Taken together, these theories suggest that a variety of constructs might be associated with SV risk; thus, these factors will be used as mechanisms to validate the proposed laboratory paradigm.

Dating and Sexual Networking (DSN) mobile application (app) use among MSM

In addition to heightened vulnerability to SV and the clustering with other syndemic conditions, MSM also frequently participate in DSN via mobile apps and other online venues [31,32]. Research indicates high rates of sexual risk behavior and more partners among internet and/or DSN app users [33,34], and a higher likelihood of using alcohol or other drugs before sex [34,35], thus highlighting the potential for SV with men met via DSN apps. While the prevalence of SV from partners met via DSN apps is unknown, research, media, and law enforcement reports suggest it may be common [36]. One study found 9.3% of women and 11.4% of men reported SV with someone met on a dating site or mobile app [37]. Research across gender and sexual orientation groups indicates a higher risk of past year SV among those who use dating apps than those who do not, though studies have not examined SV by partners specifically met via dating apps [38,39]. Similarly, a survey of DSN app-using MSM found 11% reported lifetime experience of sexual IPV [40], though not necessarily perpetrated by DSN app-using men. Finally, a recent study of violence related to DSN use in MSM found 33% reported some experience with physical or sexual victimization by someone they met on a DSN app. Also, nearly 48% noted other MSM they know who have experienced physical or SV by someone they met on a DSN app [41].

Despite limited prevalence data, DSN app-met partners pose a risk for SV for several reasons: the anonymity inherent in virtual spaces; meeting in private locations; lack of disclosure of whereabouts to others for privacy reasons or stigma avoidance; potential for perpetrators to target and access potential victims; disinhibition regarding sharing personal details in online spaces; and heightened expectations for sex [38]. It is also common for MSM to use apps while under the influence of alcohol/drugs and many individuals use substances when they meet in person [6,38].

Further, MSM are concerned for their physical or sexual safety when seeking and meeting partners online [42]. DSN app use represents a unique opportunity for MSM to detect risk factors for sexual violence, to screen potential partners, and to control their interactions [43]. MSM engage in sexual preference and risk negotiations in online spaces [44,45]. When MSM use alcohol/drugs while vetting potential partners, their ability to detect risk may also be impaired. Because MSM use DSN apps to make sexual decisions and negotiate risk, additional research is needed to understand the information that guides their decisions about sexual activity with partners met through DSN apps.

Identifying Risk Factors for Sexual Violence Perpetration Among MSM

While little is known about sexual violence risk perception and negotiation in DSN environments, the literature has identified specific risk factors among men. Specifically, for the current project, we focused on problematic alcohol and drug use, antisociality, and internalization of homophobia. First, alcohol/drugs are common in dating and sexual encounters with DSN-app-met partners [46]. Among MSM, alcohol/drug use in general, and in sexual situations specifically, predict sexual violence perpetration [47–50]. As such, alcohol/drug use cues may help identify potential partners more likely to perpetrate sexual violence.

Second, among heterosexual men, signs of antisociality, such as controlling behaviors [51], low levels of agreeableness [52], and hypermasculinity (and perhaps also a preference for those characteristics in potential partners) predict sexual violence perpetration [53]. Among heterosexual men, masculine discrepancy stress, where men perceive they do not meet traditional standards of masculinity, is associated with IPV perpetration [54], sexual risk behavior, and alcohol/drug use [55], all of which are risk factors for sexual violence perpetration. Third, and unique to MSM, minority stressors, such as internalized homophobia, or anticipating sexual orientation prejudice or discrimination correlate with perpetration [56]. That said, it is important to note that while such factors may increase risk for SV and/or affect one’s decision making and risk perception, it is never the victim’s fault for experiencing sexual violence.

Existing Measures of Sexual Violence Risk Perception

In general, researchers examining sexual violence risk perception have studied heterosexual dyads and relied on vignettes. For example, the potential perpetrator in a vignette may use alcohol or attempt to isolate the potential victim, and participants indicate the point when they would begin to feel uncomfortable and/or when they would leave the situation [57,58]. Reporting discomfort after the fact or delayed exit are conceptualized as poor sexual violence risk perception. For example, participants can be presented with a description of a "first date," and asked to rate the level of "risk" associated with several cues described in the date, such as a man paying for the date, alcohol intoxication, or making sexual comments [59,60]. This methodology has been expanded to include audio or video vignettes depicting an interpersonal situation into which participants are asked to project themselves and predict how they would respond [61,62]. Researchers then determine if participants identify the threats and remove themselves from the hypothetical situation. The longer participants take to indicate the man should stop his sexual advances, the higher the response latency, and the poorer the sexual violence risk perception.

Although sexual violence risk cues can range from ambiguous to blatant, most vignette scenarios portray clear cues and focus on high-risk situations. Further, many risk perception paradigms adhere to a third person perspective; thus, risk may not be immediate to the participant and their appraisals remain hypothetical. These measures may lack ecological validity: assumptions of how one might act may not accurately reflect one's actual behaviors when confronted with that same situation in reality. Therefore, stronger tests of risk perception entail the measurement of decision-making in an actual interpersonal interaction [60]. For example, in one paradigm, female participants engaged in a social interaction with a male confederate in a bar laboratory [63]. The researchers examined the impact of sexually ambiguous cues on participants' nonverbal behaviors and perceptions of the confederate.

Given the limitations of existing risk perception paradigms and the paucity of measures that

use an online medium, members of our team developed the “EduDate” paradigm to examine sexual violence risk perception in college women [64]. This novel online speed dating paradigm assesses threat appraisals and behavioral reactions to sexual violence risk. It provides an opportunity to study dispositional and environmental factors that influence perception of clear and ambiguous risk cues. Naturally, the use of laboratory analogue methods are limited by the nature of perpetration and by the need to engage in ethical and responsible research methods [65]. While the ultimate goal is to reduce SV, researchers are appropriately limited in their ability to mimic such behavior and examine the decision-making process of a potential victim. As a laboratory method, there is a high degree of experimental control for EduDate, which provides strong internal validity. EduDate also approximates a real-world experience, which strengthens ecological validity. EduDate incorporates behaviors consistent with the literature about perpetrators and mimics situations where women respond to potential SV in real time.

EduDate was modeled in appearance and functionality after online dating services accessible with a computer rather than through a mobile app. Participating women are told the study involves “beta testing online speed-dating software.” Participants initially view a profile of a bogus dating candidate with whom they will be having a speed date, then rate the candidate across characteristics typical of speed dating (i.e., physical attractiveness, social status, likelihood to date). Next, each participant “interacts” with the candidate through a rigged chat-based speed date of predetermined questions and responses. Once participants provide an answer to a question, they view the bogus dating candidate’s response, which presumably had been typed at the same time. The candidate responses become increasingly indicative of risk for sexual violence by the inclusion risk cues empirically established for male-on-female sexual violence perpetration. Risk perception is measured by the number of risk cues a participant tolerates, which represents behavioral response; and changes in participants’ pre-post evaluation of the dating candidate, which measures the threat appraisal [64]. There is evidence for the usefulness of EduDate to study sexual violence risk perception, which

supports adapting the paradigm to investigate sexual violence risk perception in DSN-app environments among MSM. However, potential differences in the risk factors for MSM compared to heterosexual women does necessitate an empirically driven approach to ensure the stimuli used in a paradigm are tailored for MSM. In addition, the surge of technology, including the use of mobile apps necessitates an infrastructure update to this laboratory-based tool.

The Current Study

Two primary aims guide the current study. Our first aim was the development of a rigged DSN app called "G-Date" that allows for the investigation of sexual violence risk perception in MSM. Our work on the first aim included three objectives: 1) production of an app whose appearance and functionality mimicked contemporary real time DSN apps used by MSM, while actually being a predetermined and "rigged" system in which we could embed sexual violence cues and assess participant engagement with those cues; 2) development of stimulus materials to embed in the app; and 3) refinement of the stimulus materials and app through an iterative process to ensure its appearance, functionality, and data collection capabilities were adequate for purposes of the study. The EduDate paradigm (previously validated with heterosexual women) served as a foundation for designing this new paradigm.

Our second aim (which is in-progress) is to validate the G-Date paradigm as a measure of sexual violence risk perception in MSM. We will evaluate G-Date's content validity by having participants undergo two speed dates on the app: one with a dating partner who displays SV risk cues and another with a dating partner who does not display SV risk cues. Next, we will compare participant engagement with, and ratings of, the risky versus the safe dating partners. We hypothesize that participants will end the speed date with the risky dating partner sooner than with the safe partner and will rate the risky partner more negatively at postdate. Per syndemics theory and the processes outlined in minority stress theory, we will evaluate G-Date's concurrent validity by examining the extent to which participants' existing risk factors for SV victimization (e.g., SV

history, drug/alcohol use) predict their engagement with the risky versus the safe dating partner. We hypothesize that the length of participants speed date with the risky partner, and their ratings of the risky candidate at pre-date, will be predicted by syndemic and minority stress factors associated with SV. Finally, we will evaluate the predictive validity of G-Date by examining the extent to which participants' engagement with the risky and safe dating partners predict SV rates at 9-month follow up. We hypothesize that length of participants' speed date with the risky partner, and ratings of the risky partner at post-date, will predict subsequent SV.

Methods

Ethical Approval

This study received initial ethical approval from the Rowan University Institutional Review Board on October 19th, 2020 (PRO-2020-25).

Research Design Overview

The two aims of this research involved several points of qualitative and quantitative data collection. As pictured in Figure 1 of the Multimedia Appendix, qualitative and quantitative designs were utilized to develop and refine the cover story, app procedures and functionality, and the app materials, including photos and the Q&A scripts. Data from those studies were analyzed to finalize the app and research materials for use in aim 2.

The first aim of this project entailed the production of the G-date app and protocol, the creation of the stimulus materials to embed in the app, and subsequent refinement of both stimulus materials and app to ensure their adequacy for the study. The production of G-Date app and protocol included working with an app development team led by a computer scientist and staffed with computer science graduate students. The team worked to make G-Date appear to be a contemporary DSN app geared for speed dating for MSM. We also wanted the G-Date to be developed in such a way that other researchers could easily modify components of the app's content and functionality for follow up work in this area. G-Date utilizes a software platform similar to popular dating apps, thus

its functionality and appearance would be familiar to those with even casual prior exposure to dating apps (see Figure 2 in the Multimedia Appendix). The app was built to be compatible with iOS devices (e.g., iPad iPhone, and MacBook). The protocol as experienced by the user involves four components: 1) profile set up, 2) review of potential partners, 3) Q&A speed date, and 4) partner comparison**.**

1) Profile Setup. Access to the app requires a username and password provided by the research team. Once logged in to the app, participants set up their own profile, which includes (1) taking and uploading a head shot with the G-Date logo in the background, (2) providing information about themselves such as is commonly found on dating apps for MSM such as age, relationship status, position (e.g., top, bottom, versatile), and community (e.g., bear, jock), (3) providing information about the kind of person they are seeking (e.g., age range, relationship status, position, community), and (4) answering questions about their personality.

2) Review of Potential Partners. After completion of their profile, participants then view photos of 60 prospective dating partners who ostensibly meet their desired characteristics. The photos are headshots of men in the participant's preferred age range, vary in ethnic background, and rated as attractive in pilot work (see below for more information on photos). Embedded in each photo is a "thumbs up" and "thumbs down" icon. If participants give a thumbs down to a photo of a potential partner, they move on to the next photo. If participants give a thumbs up to a photo, a starred rating scale appears on screen and participants are asked to rate the attractiveness of the potential partner on a 5-star scale before moving to the next photo. After viewing all 60 photos, participants are informed they have been matched with several partners and will get an opportunity to participate in two speed dates.

3) Q&A Speed Date. Speed dates proceed in a structured and predetermined manner. Speed date partners are selected by the app based on the highest starred ratings that participants provide to the photos viewed in the aforementioned review of potential partners. Prior to commencing a speed

date, participants rate the partner's physical attractiveness and personality, and their interest in meeting their partner in-person. Each speed date is then conducted using "G-Date's patent pending Q&A system," in which the participant and their partner respond to questions designed to maximize assessment of a partner's compatibility. During the Q&A, a question appears on the screen (e.g., *Based solely on your last date, what would that person say about you?*) and participants have 90 seconds to text their response to the question. After time has elapsed, participants see their response delivered to their partner and receive their partner's response to the same question, which presumably had been typed at the same time. After the third Q&A, participants can end or continue the speed date, and they are given the opportunity to end or continue the speed date after each subsequent Q&A. In the speed date with the safe partner, none of the partner's Q&A responses contain risk cues. In the speed date with the risky partner, the first two responses to the Q&A do not contain risk cues, but the third and all subsequent responses do; thus, every participant is exposed to at least one risky response from the risky partner and given the opportunity to end the speed date afterward. If participants remain in the risky date, every subsequent response contains a risk cue. After the twelfth Q&A, the speed date is automatically terminated. After each speed date, participants rate their partner on the same three attractiveness/interest scales as they had before the speed date.

4) Partner Comparison. After completion of both speed dates, participants are presented with side-by-side photos of their speed date partners and asked to rate each of them on a series of dimensions: Vibe, Interpersonal Style, Personality, Feeling about their Sexual Identity, Respect of Sexual Boundaries, and Alcohol/Drug Issues.

The creation of the stimulus materials included the development of the 1) script for the Q&A speed date and 2) the dating partner photos.

1) Script for Q&A speed date: Initial stimuli for the Q&A in the speed date embedded within

the app were developed based on the existing literature about SV in MSM, as well as feedback from our consultants with expertise in sexual violence among MSM. One set of stimuli was developed for the risky dating partner and contained sexual violence risk cues while a second set was developed for the safe dating partner and contained no risk cues. A total of 53 potential Q&A were then developed after extensive discussion with the primary research team and consultants to clarify the language would be appropriate for young MSM and contains a realistic degree of risk and safety. Responses containing risk cues included descriptions of loss of control over alcohol/drug use, antisociality (e.g., low empathy, narcissism, aggression), and internalized homophobia, all empirically documented constructs associated with perpetration. For example, in response to the question "*In a sentence or two, what do you like most about being in a relationship?"* the risky partner responds: "*tbh the best part is having a guy around who knows it's his job to drain my balls every day*." With regard to the safe dating partner, we developed a set of stimuli that contained no risk cues. For example, for the question "*What's one of the best ways for you to get to know a new partner?*" the safe partner responds: "*It can be a lot of diff things but I think when they share something they are passionate about like a playlist or a favorite movie it can tell you a lot about them*."

Next, using Prolific, a nationally recruited sample of 102 MSM evaluated all proposed Q&A. Participants were told, "*Imagine that you are using a speed-dating app to connect men with other men. Please read the following answers provided by a potential partner to questions about themselves, then rate their answers*." For each Q&A, participants evaluated: 1) how realistic it would be that a man provided this answer on a gay speed-dating app (0 = less realistic to 10 = more realistic), 2) how likeable the person is who potentially wrote the answer (-3 = not at all likeable to +3 extremely likeable), and 3) how likely the person who wrote the answer would be to engage in: a) verbal, b) physical, and c) alcohol/drug facilitated SV (-3 = not at all likely to +3 extremely likely). Participants were also asked whether the person who wrote the response would have: 1) substance abuse issues (they have an alcohol or drug problem or can't seem to control their usage), 2)

internalized homonegativity (self-hate; someone is uncomfortable being gay), 3) toxic personality (narcissistic, lacking empathy, or controlling and intimidating), 4) other, and 5) none of the above.

Responses were only included in the final set of Q&A if the mean realism score was greater than the midpoint of 5. Also, for the risky date, all Q&A included one or more of the sexual violence types (i.e., verbal, physical, alcohol/drug facilitated) with mean scores in the positive range, and identification of one of the primary perpetration risk constructs (i.e., substance use issues, internalized homonegativity and toxic personality) across participants. For the safe date, all Q&A included only sexual violence types with mean scores in the negative range and no indication of any perpetration risk constructs. The final Q&A responses included in the risky date were rated significantly higher on likelihood to engage in all three types of SV compared to the Q&A responses included in the safe date. Taken together these data led to the development of the aforementioned two unique dates: risky and safe.

2) Dating partner photos: We relied on artificial intelligence to initially create 139 racial and ethnically diverse headshots of men who would appear to be in their late teens to late twenties to serve as the bogus dating partners. One of our primary reasons for choosing artificial intelligence rather than actual photos stemmed from ethical concerns about using the photos of people whose physical appearance may be judged negatively and associated with the inappropriate behavior of the risky date in the Q&A. All photos were evaluated by the same nationally recruited sample of 102 MSM as above[1] to provide impressions (0 = less to 10 = more) of physical attractiveness, interest in dating , interest in having sex, as well as perceived age, race/ethnicity, community (e.g., bear, muscle guy next door), and sexual position (e.g., top, bottom, versatile).

Visualization of the photo data revealed a broad range of responses across all items. Further, our app development team suggested we limit the potential options for speed date matching in order to reduce the potentially unnecessary advanced algorithm work. To that end, we decided to split our

[1] It is important to note that due to the large number of photos and Q&A under review, each participant only saw a subset of photos presented in random order.

potential dates into two age groups based on perceived age in pilot testing: 18-23 and 24-29. We also wanted the potential dates to represent a range of attractiveness and to be racially and ethnically diverse to provide a wide range of options for each participant. Thus, anyone with mean ratings on attractiveness, interest in meeting, and/or interest in sex below 3.67 were removed from consideration. We next removed any photos with participant comments that noted "distortions" that might suggest these were AI developed images or if the photos were identified as too similar to another photo (in actuality all photos have some degree of similarity based on the generative AI algorithms used). We then chose photos representing different racial/ethnic groups based on the majority ratings by participants that fit typical categories (e.g., "white" for 65% of photos) and omitted any photos that demonstrated low scores on attractiveness and interest scales or higher average age group. This led to a final list of 96 photos for use in the app. However, given our interest in maximizing the number of headshots available for participants to choose from (similar to real world app use), we included 60 photos for each of the age categories. To this end, any photo with a mean age of 27.29 or below was included in the 18-23 category (n = 60) and any photo with a mean age of 25.82 or above was included in the 24-29 category (n = 60). This decision led to 12 photos that overlapped in both categories. In consultation with our app development team, we also noted the need to include a group of photos that would represent a "both" category for those participants that noted no preference for age group. Thus, we included the same 12 overlapping photos and a random selection of 24 photos from each of the age categories to form a "no preference" category (n = 60). Taken together, this led to three groups of 60 photos and all participants with a preference for 18-23, 24-29, or either, saw the same 60 photos respectively.

In order to refine the stimulus materials and app, we obtained qualitative feedback from MSM. We sought participants between the ages of 18-30 to best target a high-risk group in terms of victimization. Potential participants were screened online for eligibility prior to engagement in the study, which included: 1) between the ages of 18-30, 2) gender identification as a man, 3) sexual

contact with a man in the previous 12 months, and 4) have used a DSN app in the last 12 months. The online focus groups and interviews lasted approximately 1.5-2 hours and participants were paid $40 for their time. We conducted 3 focus groups and 2 interviews for a total of 14 participants using an iterative process wherein ongoing data analysis and app development informed subsequent interviews. All discussions were audio recorded and transcribed by the research team and uploaded into Dedoose for analysis. Participants had a mean age of 23.5 years (*SD* = 1.5). Half of participants self-reported as Black (50.0%, n = 7), while the others self-reported as White (14.3%, n = 2), or chose not to report their race or ethnicity (35.7%, n = 5).

Initial participants were asked to provide perceptions of what constitutes cues in an app that a person or the environment is high risk (signs that indicate a person will become sexually violent; environment poses danger), and low risk (signs that person or environment has limited risk). Later participants were presented with the prototype version of G-Date and asked to provide feedback on: 1) the app's realism, 2) the quality of the stimulus materials including the bogus candidate profile photos and Q&A, and 3) the feasibility of the cover story. In addition to guided discussion, a self-administered questionnaire was used to gather feedback. Throughout this iterative process, there were ongoing modifications of G-Date by the app developer team to incorporate further feedback about the stimulus materials and app usability.

The second (and ongoing) part of this project examines the content, concurrent, and predictive validities of the G-Date paradigm. Given minority stress and the syndemic situation of MSM, we are assessing the following SV risk factors and their relationship to participant behavior in G-Date: 1) historical sexual victimization; 2) alcohol and drug use/abuse; 3) dating and sexual behaviors; 4) psychological symptoms; and 5) minority stress indicators. G-Date also affords the opportunity to examine two related but distinct indices of risk perception: Behavioral response (number of responses tolerated from the bogus dating partner) and threat appraisal/identification (changes in the perception of the bogus dating partner). For content validity, participants' level of

risk perception will be assessed relative to their interaction with the risky vs. safe partners. For concurrent validity, participants' level of risk perception during their interaction with the risky partner will be assessed in association with their endorsement of the aforementioned risk factors for SV. For predictive validity, participants' level of risk perception during their interaction with the risky partner will be assessed in association with their SV experiences at 9-month follow up.

Participant Recruitment and Eligibility

Potential participants are being recruited via advertisements on social media platforms and in-person locations (e.g., LGBT centers, college campuses). Participant eligibility includes: 1) 18-30 years old, 2) gender identification as a man, 3) sexual contact with a man in the previous 12 months, and 4) DSN app use in the last 12 months. Any individual who participated in Aim 1 is excluded given their knowledge that G-Date is a simulation. Completion of the G-Date protocol takes approximately 1.5 hours and participants are paid $30 for their time.

Procedure

Data collection occurs within physical laboratory spaces using iPads, or over a video-call platform using participants' iPhones, iPads, or Apple laptops. Participants are told that the experimenter is "*part of a team of consultants contracted to beta test a prototype of a new speed-dating app called G-Date, for men who have sex with men.*" Experimenters explain that they are looking to evaluate "*the best speed date questions*" and want participant feedback from their dates that are limited to answering a set of predetermined questions. Participants are provided with a username and password so they can log on to G-Date and engage the paradigm. This entails creating a profile and reviewing photos of potential dating partners (as described earlier).

After being exposed to photos of 60 potential dating partners, participants are told that based on their preferences and profiles, they are able to have two dates, due to the "*limited number of users available in the beta-testing phase*." Participants then begin the first of the two dates. Each participant has one risky dating partner (Risky Condition) and one safe dating partner (Safe

Condition) as described earlier. The order of the conditions is randomized. After the G-Date paradigm, participants are asked to complete a battery of questionnaires on Qualtrics, which includes a demographic form, and a comprehensive battery of personality and behavioral measures targeting syndemic and minority stress related factors that have been theoretically and/or empirically linked with SV (see Table 1 in the Multimedia Appendix). Upon completion of the questionnaires, participants are debriefed, compensated, thanked for their participation. In order to evaluate the predictive validity of the paradigm, participants will be contacted 9 months after their initial visit to the laboratory and asked to retake the battery of questionnaires they originally completed with reference to the time period since their initial study completion.

Data Analytic plan for Aim 2

Before testing our hypotheses, adherence to distributional assumptions will be examined. When the assumptions of linear models are untenable, we will use transformations, nonparametric procedures, or generalized linear model. The family of generalized linear models will be determined based on the distribution of the data, though likely it will be either a Poisson or Negative Binomial model. Missing data will be handled via multiple imputation [66] and results will be reported using both results obtained through listwise deletion and multiple imputation. To evaluate the validity of G-Date we have three hypotheses that map onto three different types of statistical models.

Our first set of hypotheses address the content validity and premise of the G-Date paradigm, that participants will perceive and respond to the risky date differently than the safe date. Hypothesis 1: Participants will engage in less Q&A with the risky date than the safe date. Hypothesis 2: There will be larger pre-post declines in attractiveness and desirability for the risky date than the safe date. In order to evaluate these hypotheses, we will conduct paired t-tests. If the normality assumption is untenable, we will use the Wilcoxon Signed Rank Test or transform the data.

Our second set of hypotheses aim to address the concurrent validity of the G-Date paradigm by evaluating whether participants who engage longer in the Q&A and more positively evaluate the

risky date are rated higher in the various syndemic and minority-stress related characteristics associated with SV. Hypothesis 3: The number of Q&A participants engage with the risky date will correlate with, and be predicted by participants' historical victimization, alcohol and drug use/abuse, risky sexual behaviors, psychological symptoms, and minority stress. Hypothesis 4: The extent of pre-post questionnaire declines will correlate with, and be predicted by participants' historical victimization, alcohol and drug use/abuse, risky sexual behaviors, psychological symptoms, and minority stress. For some of these variables (e.g., history of SV) we expect many individuals to endorse a lack of experience. Thus, standard linear models (which assume normality) will not be appropriate. Rather, a Poisson generalized linear model, a negative binomial, or a zero-inflated model will better match the distribution of the data. To determine which distribution family is appropriate, we will conduct likelihood ratio tests, supplemented with AIC and BIC comparisons, as well as residual analyses.

The third set of hypotheses will evaluate the predictive validity of the G-Date paradigm. Participants who engage longer in the Q&A and more positively evaluate the risky date should be at higher risk for future SV while accounting for historical SV. Hypothesis 5: The number of Q&A participants engage in with the risky date will correlate with and predict 9-month SV. Hypothesis 6: The extent of pre- to post- dating questionnaire declines will correlate with and predict 9-month SV. As in the previous hypotheses, many of these variables are expected to follow a non-standard (i.e., non-normal) distribution. The results of hypotheses 3 and 4 will inform selection of both the type of model for hypothesis 5 and 6, as well as the selection of priors for the parameters in a Bayesian analysis.

Given that the targeted sample size (325) is only slightly more than the estimated sample size required to detect statistical significance via a priori power analyses (275), a Bayesian analysis will increase the chances of the sample size being adequate. The prior distribution for the Bayesian analysis will be estimated from the relationship between past victimization and risk perception.

Provided the relationship between past victimization and risk perception yields similar parameters to the relationship between 9-month victimization and risk perception, the Bayesian results will yield more precise estimates than traditional (likelihood/frequentist-based) procedures. However, given the unfamiliarity most users have with Bayesian analysis, we will perform the analysis in three ways: (1) using traditional (likelihood/frequentist-based) statistical procedures, (2) using Bayesian analysis with priors obtained from the relationship between past SV and risk perception, and (3) using a Bayesian analysis using "uninformative" priors, which are prior estimates of the parameter that will heavily weight the data in estimating the parameters, rather than the user-specified priors. The results from these three models will serve as a sensitivity analysis; they will be presented side-by-side in an effort to maximize transparency and highlight differences (if any) in the scientific conclusions reached as a function of the models' assumptions. In addition, it is expected that some individuals will drop out before the completion of the study. As mentioned previously, all the available data will be used to generate a Multiple Imputation model to impute the missing values. The results from each imputation will be averaged using Rubin's imputation rules, [66] and these aggregated results will be presented alongside the more common method of listwise deletion.

Results

Funding for this project began September 10, 2020. Development of the G-Date app commenced in October 2020. Enrollment of participants for Aim 2 commenced in December 2022. As of May 2024, 245 participants have completed the protocol. Participant recruitment is expected to continue through August 2024 and data collection is expected to be completed in May 2025 to allow for a nine-month follow up. Final results of the project are expected to be submitted for publication in December 2025.

Discussion

Principal Findings

Findings from the study will test G-Date's content, concurrent, and predictive validity. With respect to content validity, we anticipate that participants will rate the risky date more negatively and terminate the Q&A date sooner relative to the safe date. With respect to concurrent validity, we anticipate that syndemic and minority stress related factors such as prior SV and substance use will impact participants ratings and termination of the risky vs. safe date such that greater syndemic and minority stress will be associated with impairments in risk perception. Finally, with respect to predictive validity, we anticipate that participants' risk perception during G-Date will predict SV at 9 month follow up.

Comparison with Prior Work

Our prior work in sexual violence risk perception utilized an online speed dating paradigm (EduDate) designed for a desktop or laptop computer reflecting the technology of the era in which it was developed. G-Date represents an advance in that it is designed as a mobile app, and mimics contemporary DSN apps used by MSM. Further, the stimuli of the EduDate paradigm were developed for use with heterosexual women, while the content of G-Date was developed specifically for use with MSM, an understudied but high-risk population for SV.

Strengths

The present proposal has several methodological strengths. G-Date is built on a software platform similar to that of popular dating apps, thus its appearance, and general functionality from setting up a profile to swiping and rating photos of potential partners can be easily understood and utilized by participants who have only prior experience with DSN apps. The risk cues embedded in the risky date are derived from the empirical literature, while the language and context in which the cues are presented in the Q&A were vetted and shaped by discussions with consultants and focus groups and found in pilot testing to be realistic and indicative of risky content. The use of artificial intelligence to generate photos allowed for a diverse range of attractive headshots of varied ethnic backgrounds without the ethical concerns of using actual photos whose appearance would be judged

and whose simulated behavior in the Q&A could be expected to be seen negatively. Finally, we embedded manipulation and suspiciousness checks that will allow to flag data from participants who did not attend to the risk cues or who did not believe the cover story for the protocol.

Limitations

There are a number of methodological and practical challenges involved in the undertaking the present project. First, one methodological issue common to laboratory analogues is external validity. Participants may behave differently on G-Date from how they might ordinarily behave when using a DSN app in the community. While G-Date stimuli were pilot tested for validity, there may be different contextual factors related to participation in the study (e.g., beta testing an app for compensation, the presence of an experimenter) that influences participants to behave with heightened or reduced caution. A second related external validity concern is the generalizability of the participants' risky behavior in G-Date to risky decision making during real-world in-person dates or hook ups. It is possible that participants who engage in more risk in G-Date are in fact more cautious about when it comes meeting a new online acquaintance in-person. We hope to be able to address these potential limitations through the 9-month follow up with participants, when we will assess their subsequent DSN behavior, SV, and substance abuse, among other risk variables. A third potential limitation could be a lack of SV experiences reported by participants both initially and at the 9-month follow up. This would reduce our ability to explore G-Date's predictive and concurrent validity. A possible remedy for this problem would be to increase the number of participants and identify a more "at risk" sample, such as specific subgroups of MSM. A related predictive validity concern is extensive attrition at the 9-month follow up. To that end, we plan to periodically remind participants about the 9-month follow up, and to provide a monetary incentive at 9-month follow up.

Future Directions

Upon successful validation of G-Date, we anticipate using the refined paradigm on an ongoing basis to elucidate the range and relative strength of risk factors that can inform SV

prevention endeavors, especially the study of risk detection under the effects of alcohol intoxication. For example, we anticipate embedding G-Date in an alcohol administration protocol to parse the unique influence of intoxication, as well as the nexus of intoxication and other relevant alcohol/drug use factors. We also believe G-Date can be used within prevention programs. First, since G-Date will serve as a validated measure of risk perception, it can be used as a tool to measure the success of relevant intervention programs. For example, G-Date behaviors could be evaluated both pre- and post-intervention and the successful program would demonstrate an increase in participant risk perception over time. Second, G-Date might be used as a stand-alone mechanism for prevention programming. For example, the paradigm could be used to educate participants about navigating sexual risk and communication in DSN-app environments. Thus, participants engaging in G-Date could be reinforced for decisions that could protect them from SV, and educated about decisions that could increase risk for SV, in real time.

Conclusions

This project aims to (1) design a new laboratory paradigm in the form of a DSN app called G-Date that can be used to investigate sexual violence risk perception in MSM, and (2) evaluate G-Date's content validity, concurrent, and predictive validity by examining the relationship between participant engagement in the app with risky and safe dating partners and their status on a battery of syndemic and other minority stress factors. The findings have the potential to provide a new methodological tool for basic and applied researchers, and advance understanding of crucial factors related to sexual violence risk perception and SV in MSM.

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Abbreviations

app(s) = mobile application(s)

DSN = dating and sexual networking

MSM = men who have sex with men

SV = sexual victimization

Supplementary Files

Untitled.
URL: http://asset.jmir.pub/assets/7b21da23553e732655224dbfa69e9a47.docx

Multimedia Appendixes

NIH Summary Statement.
URL: http://asset.jmir.pub/assets/c51ff18c2316be63c18dd37174e4cf57.pdf

Combined Tables and Figures.
URL: http://asset.jmir.pub/assets/acb7d994c03d35407f025492a31e6541.docx