Title: Using Open Contest and Neuro-influence Experiment to Develop and Evaluate PrEP Promotion Messages for High Risk Men

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INTERVENTIONAL
RESEARCH PROTOCOL TEMPLATE
(HRP-503a)

STUDY INFORMATION

- **Title of Project:**

Using Open Contest and Neuro-Influence Experiment to Develop and Evaluate PrEP Promotion Messages for High Risk Men

- **Principal Investigator Name**

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- **Protocol Version and Date:**

V1. 1/23/2022

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1.0 Research Design

1.1 Purpose/Specific Aims

A. Objectives

This study will examine the feasibility, acceptability, and utility of neuroimaging technique to evaluate pre-exposure prophylaxis (PrEP) promotion messages for men who have sex with men (MSM) at risk of HIV in Baltimore, MD. The **specific aim** is:

Evaluate the effectiveness of PrEP promotion messages developed via a crowdsourcing open contest[1] by assessing neural bases of persuasion.

B. Hypotheses / Research Question(s)

This is an experimental study using neuroimaging technique to assess the persuasiveness of messages developed by a crowdsourcing open contest approach the study team conducted previously.

We hypothesize that, compared with participants viewing messages developed by a social marketing approach:

H1. Participants viewing top messages developed via open contests will show higher brain activation in the Medial Prefrontal Cortex (MPFC) regions.
H2. A greater proportion of participants viewing top messages developed via open contests will report increased willingness and behavioral intention to take PrEP.
H3. A greater proportion of participants viewing top messages developed via open contests will report taking PrEP action and initiation during 30-day follow up.
H4. Brain activation in the MPFC regions is significantly more correlated with PrEP action and initiation than self-reported message effectiveness.

1.2 Research Significance

With the release of pre-exposure prophylaxis (PrEP) clinical guidelines by the CDC, there has been increased effort to identify effective strategies for increasing awareness, acceptability, and uptake of PrEP as a HIV primary prevention tool, especially among men who have sex with men (MSM). Pre-testing the effectiveness of campaign materials prior to large-scale implementation is highly beneficial given the significant expenditures associated with the implementation of a large-scale campaign. Evidence in neuroscience has demonstrated that neural responses hold the potential to be significantly more reliable than self-report measures to assess message effectiveness that is highly predictive of future behavior change.[2] Successful persuasion has been associated with brain activity in Medial Prefrontal Cortex (MPFC), through a process of self-integration (i.e. increased brain activity for messages and cues that are successfully integrated with one's self-concept).[3]

This proposal will examine the feasibility, acceptability, and utility of neuroimaging technique to evaluate PrEP promotion messages for MSM at risk of HIV in the United States. Findings of this proposed study will transform the design, evaluation, and implementation of HIV

campaigns, potentially bringing new ideas for local health departments and community-based organizations in developing more impactful PrEP campaigns.

1.3 Research Design and Methods

This study is a randomized control trail (RCT). A total of 60 participants will be recruited and enrolled into this RCT where half of them will view PrEP promotion messages developed via a crowdsourcing open contact[1] and half of them will view PrEP promotion messages developed via social marketing.

A. Research Procedures

This study will be conducted as follows:

- Screening will be conducted in person after an oral consent. Once an individual is screened eligible, he will provide an informed consent and complete a baseline survey. A 2nd in-person visit will be scheduled, roughly a week after completing the baseline survey.
- During the in-person visit, participants will be randomized to one of two conditions: a) viewing top three messages developed by an open contest implemented in Baltimore, or b) viewing PrEP campaign messages that were developed with a traditional social marketing approach.
- After the randomization, a research assistant will take the participant to a private interview room. The research assistant will measure and fit the participant's head for the fNIRS headband, which is connected to a NIRSport. NIRSport is a portable fNIRS device to measure the neural response as participants view various messages on a computer screen with audio computer assistance. Similar to functional magnetic resonance imaging (fMRI), fNIRS is a non-invasive neuroimaging technique to measure key brain regions associated with influence and persuasion. Unlike fMRI, fNIRS only collects data ~3 cm into the cortex, yet the advantages of fNIRS are that it is small, portable, quiet, and does not require being still in a narrow tube. Employing harmless light sources, fNIRS is safe for studies with infants and adults as well. fNIRS involves wearing a lightweight cap from which LED lights are directed into the brain. The LED light emerges from the brain in predictable patterns and the way in which active brain tissue absorbs light allows us to reconstruct fMRI type images of the activity in the cortical surface. fNIRS have been widely used in social neuroscience research.
- Participants in each group will view multiple messages on a computer screen while brain activity is recorded.
- After completing all messages, participants will answer questions on perceived effectiveness of the messages, self-efficacy, and willingness and behavioral intention to use PrEP. Semi-structured questions on the acceptability of fNIRS will also be asked.
- All participants will complete a 30-day follow up survey by phone call or online to assess any behavioral change.

B. Data Points

1) Baseline: survey
2) In-person visit: neuroactivity and survey
3) 30-day follow up: online or phone survey

C. Study Duration

2 months

D. Endpoints

N/A

1.4 Preliminary Data

Our team has investigated the feasibility and validity of using fNIRS to measure brain activity in regions associated with influence and persuasion. In an experiment of 41 participants recruited from Amman, Jordan, Dr. McCulloh found that the fNIRS was able to measure several brain regions associated with influence and persuasion, including MPFC as the region most commonly predictive of individual and population-level behavior change in past studies.[4] Our team has developed an fNIRS protocol manual detailing specific methods for maximizing and standardizing use of equipment that will be updated periodically to reflect best practices and lessons learned.

1.5 Sample Size Justification

We aim to recruit 60 participants. In a recent systematic review of 20 studies that examined persuasive processing and outcomes of the health messages using neurocognitive measures,[9] the sample size ranged from 14 to 91.[5] Our primary goal for conducting this experimental study is to examine any preliminary evidence for the efficacy of an open contest approach to develop effective PrEP promotion messages. Effect-size estimates determined through this study will be essential in the design of a larger and fully powered efficacy study that tests intervention effects on PrEP uptake.

1.6 Study Variables

A. Independent Variables, Interventions, or Predictor Variables

Intervention: top three messages developed by an open contest implemented in Baltimore[1].

B. Dependent Variables or Outcome Measures

Brain activity**:** fNIRS detects the ratio of oxygenated (O2HB) to deoxygenated (HHB) hemoglobin based on their optical properties, with higher ratios indicating greater neural activity. Neural tissues are relatively transparent to light in the near infrared range between 700-1000 nm, and O2HB and HHB reflect distinct wavelengths in this range. By modulating light at different wavelengths, emitting the light on the skin-exposed areas of the cranium, and detecting that light, fNIRS measures the blood oxygenation level dependent signal (BOLD) like fMRI. Because the photons reflected from neural tissue follow a reliable 'banana-shaped' path, photodetectors can be used to measure this on the scalp. By measuring the amount of absorbed light directed at the neural tissue, we can measure the amount of O2HB and HHB present in a region of the brain at a given time and draw inferences about the level of neural activity.

PrEP-related beliefs, willingness, behavioral intention, and behavior:
All questions will be asked to participants at baseline (only to individuals aware of PrEP), at the in-person visit after reviewing all messages, and at the 30-day follow up, except questions on PrEP action and initiation, which will only be asked at the 30-day follow up.

1.7 Drugs/Devices/Biologics

N/A.

1.8 Primary Specimen Collection

N/A.

1.9 Data Collection

A. Primary Data Collection

- **Location**:

Baseline survey: in-person data collection in a private office

Neuroimaging data and post-messaging survey: in-person data collection at the private office in a community partner/community-based organization.

30-day follow up survey: online or over the phone

- **Process of Data Collection**:

Once an individual is screened eligible, he will provide an informed consent and complete a baseline survey. An in-person visit will be scheduled, roughly a week after completing the baseline survey. During the in-person visit, participants in each group will view multiple messages on a computer screen while brain activity is recorded. After completing all messages, participants will answer questions on perceived effectiveness of the messages, self-efficacy, and willingness and behavioral intention to use PrEP. Semi-structured questions on the acceptability of fNIRS will also be asked. All participants will complete a 30-day follow up by phone call or online to assess any behavioral change.

- **Timing and Frequency**:

Baseline survey, in-person visit/one week after completing the baseline survey, 30-day follow up

- **Procedures for Audio/Visual Recording**:

N/A.

- **Study Instruments**:

PrEP-related beliefs, willingness, behavioral intention, and behavior:
All questions will be asked to participants at baseline (only to individuals aware of PrEP), at the 2nd visit after reviewing all messages, and at the 30-day follow up, except questions on PrEP action and initiation, which will only be asked at the 30-day follow up.
Self-efficacy: Participants will be asked, on a 4-point Likert scale ranging from strongly disagree to strongly agree, to rate their agreement with the statement "I feel confident I could take PrEP as prescribed."

Willingness: Participants will be asked, "Suppose that PrEP is at least 90% effective in preventing HIV when taken daily. How likely would you be to take PrEP if it were available for free?" with responses ranging from "I would definitely take it" to "I would definitely not take it."[60]
Behavioral Intention: We will assess behavioral intentions to actually begin PrEP based on a real-world situation. To do this, participants will be asked, "PrEP is currently available with a prescription from your doctor and research has shown that a majority of insurance companies cover most or all of the costs of PrEP. Do you plan to begin PrEP?" Response options range from "Yes, I will definitely begin taking PrEP" to "No, I definitely will not begin taking PrEP."
PrEP action and initiation: Items include "Have you spoken with a provider about PrEP during the past 30 days?" and "Have you started taking PrEP during the past 30 days?"

Message-related measures:
All questions will be asked after participants finish reviewing all messages during the in-person visit.
Perceived effectiveness: Participants will be asked, on a 4-point Likert scale ranging from strongly disagree to strongly agree, to rate their agreement that the message is believable, new, unconvincing, important to them, helps them feel confident about using PrEP, would help their friends use PrEP, put thoughts in their mind about using PrEP.

Baseline survey
Socioeconomic status: We will collect data on age, highest level of education attained, housing, employment history, health insurance status, access to health care. sources and amount of personal and household income,
Sexual identity: We will use a question from our previous study which asks participants to choose from heterosexual/straight, bisexual, homosexual/gay/same-gender loving, or not sure/questioning.
Sexual history: number of sex partners, sex of the partners, condom use in the past 90 days
Social media use: Types of social media sites used for socializing, seeking sex partners, and seeking health-related information.
HIV testing history

- **Ethnographic Studies, Interviews, Or Observation**:

N/A

- **Subject Identifiers**:

We will collect identifiable information, including name, email address and phone numbers, which will be kept in secured Participation Database during the enrollment. All identifiable information about each participant is kept separate from the participant's study ID number. We maintain a master list that links study ID number and identifier. The linkage between study ID number and identifiable information will be encrypted and saved on a password-protected server. The master list must be retained in order to plan subsequent stages of follow up, but it will be destroyed at the completion of the study.

1.10 Timetable/Schedule of Events

Study Activity							
	0	2	4	6	8	10	12
Training and IRB approval							
Recruit participants and collect baseline survey							
Conduct neuro-influence experiment using fNIRS							
Collect follow up survey							
Analyze data, write manuscripts and develop dissemination report							
Develop applications for future work							

2.0 Project Management

2.1 Research Staff and Qualifications

This study builds upon and extends the research team's extensive experience in HIV prevention with MSM in Baltimore, social neuroscience, and health communication. Our research team has a strong record of working with MSM and community partners in Baltimore in the past 10 years. **Dr. Yang (PI)** has led multiple studies specifically with the MSM population in Baltimore, including the NIAAA-funded Alcohol Intervention with MSM, NIAID/JHU Center for AIDS Research-funded EMA of alcohol use and sexual behaviors, and NIMHD-funded R01 on stress. **Dr. McCulloh (consultant)** is an expert on neural bases of persuasion and influence, online influence, measurement, and assessment. He brings expertise of an innovative application of neuroscience outside the field of HIV/AIDS. Dr. McCulloh has recently conducted multiple neuro-influence experiments using fNIRS. **Dr. Moran (Co-I, Johns Hopkins)** brings her expertise in health communication, persuasion, and message design.

2.2 Research Staff Training

All research staff who will receive extensive training in ethical guidelines regarding professional conduct and in how to approach and engage potential study participants.

While there is currently no formal training or certification required for use of an fNIRS device, attending a training workshop such as those offered yearly by BIOPAC Systems Inc., a company that sells fNIRS equipment in the United States, and the Athinoula A. Martinos Medical Center in Massachusetts that offers 3 day workshops, will be required for research staff who will operate fNIRS. They will also be supervised by study consultant Dr. Ian McCulloh.

2.3 Other Resources

JOY Baltimore is a LGBTQ-serving organization in Baltimore. JOY Baltimore provides access to emergency and permanent housing, medical and dental services, community services vital records and MD State ID. Since 2017, Dr. Cui Yang has collaborated with JOY Baltimore on an NIH-funded project (R34MH116725) to develop pre-exposure prophylaxis (PrEP) promotion messages for Black young adults in Baltimore. JOY Baltimore will offer private office for Dr. Yang with a locked cabinet to store project-related documents and a private space for participants enrollment and data collection.

2.4 Research Sites

School of Public Health, Rutgers, the State University of New Jersey, 683 Hoes Lane West, 2nd Floor, Piscataway, NJ 08854

3.0 Multi-Center Research

N/A

4.0 Subject Considerations

4.1 Subject Selection and Enrollment Considerations

A. Method to Identify Potential Subjects

Participants will be recruited from a range of settings, including venue based outreach at community partner sites (CBOs, health clinics), street outreach, printed and online advertisements (CBO websites or Facebook pages), and word of mouth referral.

B. Recruitment Details

Recruitment staff will assess willingness of the establishment gatekeepers to permit recruitment activities. Recruitment of participants will be conducted by research staff who will receive extensive training in ethical guidelines regarding professional conduct and in how to approach and engage potential study participants. Staff will be asked to sign a pledge to protect respondent privacy and confidentiality. Recruitment staff will have a cellular phone to contact the study PI and/or security in the event that they are concerned about their safety. Each person approached will be given a project recruitment flyer that provides basic information regarding the study. Potential participants will be given information about the nature of the study, the time involved, and informed that they will be financially reimbursed for their time. In order to reduce potential embarrassment or inadvertent disclosure of HIV or sexual behaviors the script will include the comment, “If this doesn't apply to you, please give it to someone you know.”

C. Subject Screening

Participants will provide verbal consent to be screened for the study. Eligible participants will be asked to provide written consent, complete a baseline survey and scheduled for the baseline visit.

- **Inclusion Criteria**

Key inclusion criteria in this study are 1) 18 years and older; 2) biological male sex at birth; 3) sexually active with men in the past 6 months; 4) never taken PrEP; 5) HIV negative; 6) reside in Baltimore City or surrounding counties; and 7) meet one of the criteria for being an appropriate PrEP candidate[1]: a) in a relationship with a partner not known to be HIV-negative, b) were in a nonmonogamous relationship, c) had any condomless anal sex with a casual male partner regardless of status in the prior 6 months, or d) had a positive STI diagnosis within the prior 6 months.

- **Exclusion Criteria**

N/A

D. Privacy Protections

The protocol recognizes that the major danger of a breach of confidentiality lies with the research staff who know both the identity of the participants and the data furnished. It is recognized that there is no absolutely certain way to prevent breaches of confidentiality by interviewers, but the risk of breach will be minimized through careful selection and training of the interviewers. Any new staff will be carefully selected based on qualifications and prior experience, with all of the identified research staff and interviewers already known to the PI. All project staff members are required to complete the Protection of Human Subjects Computer-based Training and Education program. All project staff will sign a pledge of confidentiality. Utmost care will be taken when contacting participants about enrollment and participation. Study staff will only talk to the participant directly unless the participant has authorized staff to leave a message or have contact with others pursuant to follow up visits. Data can be readily downloaded and converted to the format of commercially available statistical software. Participants provide contact information (email address or phone numbers) which will be kept in secured Participation Database. All personal information about each participant is kept separate from the participant's ID number. We maintain a master list that links code number and identified information. The linkage between code number and identifiable information will be encrypted and saved on a password-protected server. The master list must be retained in order to plan subsequent stages of follow up, but it will be destroyed at the completion of the study.

Questions in the surveys will include sensitive information, such as sexual behaviors. This information could be potentially damaging to the subjects. The information will be obtained by a trained interviewer supervised by staff experienced in carrying out this activity and maintaining confidentiality in the various phases of the study. This study will be funded by NIH, and study data will be protected from the Attorney General of the United States under the Comprehensive Drug Abuse Prevention and Control Act of 1970 (i.e., Certificate of Confidentiality).

> **UPLOAD** to e-IRB Section 11.0 Recruitment Materials – ***all*** recruitment materials, such as: in-person or telephone scripts, emails, flyers, posters, social media posts, and radio or television advertisement scripts, etc. that will be used to recruit individuals to the study.

4.2 Obtaining Identifiable Information About Non-Subjects

N/A

4.3 Number of Subjects

A. Total Number of Subjects

We expected to screen 100 individuals. Seventy will be eligible and consent for participation. We need 60 individuals to complete the study.

B. Total Number of Subjects If Multicenter Study

N/A

C. Feasibility

Dr. Yang has a long history of working with local community partners to recruit study participants.

4.4 Consent Procedures

A. Consent Process

- **Location of Consent Process**

Written consent at the recruitment sites.

- **Ongoing Consent**

N/A

- **Individual Roles for Researchers Involved in Consent**

All participants will have a copy of the consent form to keep for their records. Research staff will be available to answer questions about the consent form when the participants are reading it, and they will also answer any questions that are raised later in the process (e.g., during the assessment, experimental session, or follow up).

- **Consent Discussion Duration**

Research staff will be available to answer questions about the consent form when the participants are reading it, and they will also answer any questions that are raised later in the process (e.g., during the assessment, experimental session, or follow up).

- **Coercion or Undue Influence**

In the consent form, we explain the voluntary nature of participation, any alternatives to participating, the ability to withdraw at any time

- **Subject Understanding**

Staff will ask participants to describe briefly the study procedure.

- **Protecting Privacy**

Individuals will have their own privacy while reading the consent. Research staff will be available if they have any questions.

B. Waiver or Alteration of Consent Process

N/A

UPLOAD to e-IRB Section 13.17 Consent Form - The consent form(s) and consent script(s) you plan to use to inform and consent individuals to take part in the research.

C. Documentation of Consent

- **Documenting Consent**

We will ask participants to sing the consent document. All participants will have a copy of the consent form to keep for their records.

- **Waiver of Documentation of Consent (i.e., will not obtain subject's signature)**

N/A

4.5 Special Consent Populations

N/A

4.6 Economic Burden and/or Compensation for Subjects

A. Expenses

Costs to participants may include transportation to the study site to complete consent, the baseline survey and neuroimaging experiment. In return for participants' time and effort, they will be paid compensations for completion of the baseline survey and neuroimaging experiment.

B. Compensation/Incentives

Participants will receive $ 85.00 in the form of visa gift cards for taking part in this study according to the following schedule:

- $ 15.00 to complete the first survey
- $ 60.00 at your study visit
- $ 10.00 to complete the follow-up survey.

C Compensation Documentation

We will document study ID with payment amount, date and signature of the research staff who issued the payment.

4.7 Risks of Harm/Potential for Benefits to Subjects

A. Description of Risks of Harm to Subjects

- **Reasonably Foreseeable Risks of Harm**

There is a risk of discomfort associated with answering sensitive survey questions about their behaviors as part of the behavioral surveys. We will explain the nature of the questions to be asked during the consent process and all participants will be able to refuse to answer any questions or terminate the survey at any time. There is also a small potential risk of loss of confidentiality in all research, but risk to participants will be minimized by training all staff in the ethical conduct of research and the strict protection of the data through using password protected databases and double-locked cabinets to written consent forms, which will have participants' signature. Data will only be shared following secure transfer.

There are no known risks associated with the use of fNIRS, which employs harmless light sources, fNIRS is safe for studies with infants and adults as well. However, participants may feel uncomfortable wearing the headband connected to fNIRS. They may also experience fatigue from looking at a computer screen while wearing the headband.

- **Risk of Harm from an Intervention on a Subject with an Existing Condition**

None

- **Other Foreseeable Risks of Harm**

None

- **Observation and Sensitive Information**

N/A

B. Procedures which Risk Harm to Embryo, Fetus, and/or Pregnant Subjects

N/A

C. Risks of Harm to Non-Subjects

N/A

D. Assessment of Social Behavior Considerations

All study staff undergo a training facilitated by an expert in Crisis Response to recognize signs of suicidal behavior or ideation and other psychological disturbances and appropriate procedures to follow in these cases.

E. Minimizing Risks of Harm

Research participants will be protected against discomfort and loss of confidentiality as much as possible by conducting all study procedure in private and comfortable locations. Risk to subjects will be minimized by: 1) training all staff in the ethical conduct of research; 2) strict protection of confidentiality through detailed standard operating procedures and on-site monitoring; 3) careful handling of sensitive data, procedures and processes in place to ensure data are securely stored and transferred; and 4) referral of participants to professionals or community agencies with medical health training or other appropriate services when necessary. While the potential risks to subjects are low, any social harm will be reported to the PI and a serious event will be reported to the Rutgers IRBs within 24 hours.

Should any participant experience discomfort or distress from participation in the study, we will provide the participant with the appropriate referral needed for follow-up and care.

All research staff will undergo extensive training prior to beginning the study, including training on issues of confidentiality. In addition, all study staff members will be trained in ethical conduct of research. Data containing identifiers will be stored on Rutgers' secure servers.

Furthermore, privacy and confidentiality will be protected in several ways: 1) survey responses will be captured on the highly secure server, only with participants' study ID; 2) no subject will be identified in any report or publication; 3) all study materials and data collection forms will be kept in locked and password protected files; 4) data will be analyzed collectively and individual participant data will remain anonymous.

- **Certificate of Confidentiality**

This study is NIH-funded for which a Certificate of Confidentiality is automatically issued to protect the data obtained.

- **Provisions to Protect the Privacy Interests of Subjects**

F. Potential Direct Benefits to Subjects

The most important direct benefit of participating in this study is that participants may initiate PrEP after being exposed to the PrEP promotion messages. Potential indirect benefits include psychological and social support, where staff will make appropriate referrals for psychological and social support services in their area. Another potential benefit is that participants may experience the altruistic benefit of participating in a study that contributes to health of MSM, ultimately strengthening the MSM community in the US.

5.0 Special Considerations

5.1 Health Insurance Portability and Accountability Act (HIPAA)

N/A.

5.2 Family Educational Rights and Privacy Act (FERPA)
N/A.

5.3 Code of Federal Regulations Title 45 Part 46 (Vulnerable Populations)
N/A.

A. Special Populations
N/A.

5.4 General Data Protection Regulation (GDPR)
N/A.

5.5 NJ Access to Medical Research Act (Surrogate Consent)
N/A.

6.0 Data Management Plan

6.1 Data Analysis
Our primary aim in this study is to assess the effectiveness of PrEP promotion messages developed via open contest by assessing brain activation in the regions associated with persuasion (i.e., Medial Prefrontal Cortex (MPFC)), and any changes in participants' PrEP willingness, behavioral intention, initiation, and action in 30-day follow up. We will first assess whether the randomization has worked by comparing baseline demographic and confounding variables of participants in each arm using Fisher's exact test for dichotomous variables, analysis of variance (ANOVA) tests for nominal variables and normally distributed continuous variables, and Wilcoxon signed-rank tests for non-normally distributed continuous variables, with statistical significance determined at alpha=0.05. Any variable for which randomization did not result in equal proportions in each arm will be incorporated into the multivariate models as a potential confounding variable.

Next, we will conduct primary inferential analyses to compare a) the level of neural activity in MPFC, b) increase in willingness and behavioral intention to take PrEP between baseline and 30-day follow up (yes/no), and c) PrEP action and initiation at 30-day follow up (yes/no) among participants in the three conditions. fNIRS detects the ratio of oxygenated (O2HB) to deoxygenated (HHB) hemoglobin based on their optical properties, with higher ratios indicating greater neural activity. By modulating light at different wavelengths, emitting the light on the skin-exposed areas of the cranium, and detecting that light, fNIRS measures the blood oxygenation level dependent signal (BOLD) similar to fMRI. Because the photons reflected from neural tissue follow a reliable 'banana-shaped' path, photodetectors can be used to measure this on the scalp. By measuring the amount of absorbed light directed at the neural tissue, we can measure the amount of O2HB and HHB present in a region of the brain at a given time and draw inferences about the level of neural activity. The level of brain activation for the top message condition compared to references will be evaluated using pairwise comparison. For the binary outcome measures, increase in willingness and behavioral intention to take PrEP and PrEP action and initiation, we will first compare proportions by conditions separately for each measurement period using standard bivariate analytic techniques such as Spearman rank-order correlations, odds ratios, and Fisher's exact test. Then we will employ generalized linear mixed

models (GLMM) to evaluate the effectiveness of top messages developed via open contest. GLMM permits us to measure the fixed effect of the top messages developed via open contest on neural activity, willingness and behavioral intention to take PrEP, and PrEP action and initiation, while allowing a random effect that accounts for within-person correlation. Given the binary nature of two primary outcomes, we will specify a logit link function for our GLMM models. Comparisons of characteristics of participants who are lost to follow-up to those who are evaluated will be conducted to assess for systematic patterns that could influence results.

6.2 Data Security

For survey assessments, we will use Qualtrics. Data will be saved to the Qualtrics server, which is encrypted and password protected. All research data will be stored on a password protected OneDrive server and managed by the Rutgers University Information Technology group. Survey responses and neuroimaging data will be kept separately from participants' contact information; the two files will be linked with a non-descript, unique, randomly study ID. Only the PI and a designated senior staff member will have the password to access to the "key" that links the non-descript identifier to personally identifiable information. Written consent forms will be kept in a locked cabinet in a private office with video surveillance.

We will share deidentified data with co-investigators in other institutions or other researchers who express interest in analyzing the data. All data will be stripped of all direct and indirect identifiers and shared via secure server.

After receiving a signed and dated Data Use Agreement and Human Subjects Research Training Certificate from the data requestor, the data custodian will:

i. seek approval from the Principal Investigator to distribute these data;
ii. confirm that the data requestor is aware of all applicable data security standards;
iii. use a method of distribution in accordance with existing policies;
iv. document the event in an electronic database;
v. make contact with the data user twice a year to appraise their need to continue using these data;
vi. electronically retain all communications regarding the continued use of the data.

With the agreement of the PI the data user may continue to use these data. If the user is asked to destroy these data, the user must do so in accordance with the Data Use Agreement policies and must advise the data custodian that these data have been destroyed.

6.3 Data and Safety Monitoring

A. Data/Safety Monitoring Plan

PI will be responsible for implementation and management of the Data/Safety Monitoring Plan (DSMP). Ongoing monitoring will be conducted throughout the study. In addition, Rutgers University IRB will conduct regular reviews of study protocols, changes in study protocols, and adherence to protocols in the field. PI is required to report any unexpected study-related adverse events to the IRB and NIH.

DSMP takes steps to minimize the risk of breach of confidentiality, including procedures to prevent unauthorized use of study data. Names will not be attached to any research instruments or digital files, and all participant data will be identifiable only using the sequentially assigned

Study ID number. All investigators have experience collecting data or conducting interventions with marginalized populations.

Data Gathered During Screening. We will assess potential participants' eligibility for the study using a series of screening questions, which will not include any personal identifying information. We will destroy any and all notes taken during screening after we verify that each participant is eligible for the study.

Study Data. All study data will be password-protected using a password known only to essential project staff. Data will be linked to participants' sequentially assigned Study IDs, but it will not be linked to any personal identifiers. Any identifying information, including the participants' name, email address and phone number, will be kept separate from data at all times. Unique IDs and participant contact details will be stored in a separate database; contact details will be destroyed for each participant immediately after they receive the study compensation. A list of Unique IDs may also be stored on a password-protected file, separate from all study data.

Monitoring. The PI will provide ongoing supervision and training to essential study staff at monthly meetings, which will also ensure continued compliance with data safety protocols. Participants in human subjects research inevitably give up some privacy to share data about their individual experiences; however, we believe our data safety and monitoring plan will minimize the risks of any further breach of privacy or confidentiality. The Investigators will be responsible for ensuring that study protocols for maintaining confidentiality are followed.

Collection, Management and Reporting of AEs and SAEs. Adverse events (AEs) on which reports are collected by the study staff include not only physical harms, such as mortality, suicide, accidents (traffic and other) and violence, but also social harms, such as arrest, incarceration, harassment by the police, being expelled from school or work, and instances of discrimination. Breaches of confidentiality would also be considered an adverse event. Serious adverse events (SAEs) are based on the FDA definition and defined as those that result in death, are life-threatening, result in hospitalization or prolongation of existing hospitalization, a persistent or significant disability, a congenital abnormality or birth defect. Other injuries or medical events may be considered to be serious adverse events when, in the opinion of a physician, they may jeopardize the participant and may require medical or surgical intervention to prevent one of the above outcomes.

In the consent forms, all participants will be reminded to report any physical or social harm to the study staff immediately, so that participants may receive counseling or other assistance. Participants also are asked whether they have suffered any of a list of social harms or other adverse impact that may be attributed to study participation.

When an adverse event is reported to the study staff, the staff investigates the details of the event and reaches a determination as to whether occurrence of the event was related to participation in the study. They will refer the participant to medical, psychological or social services as deemed appropriate, and if deemed necessary by the investigators may take action to terminate the participant from the study.

The staff will complete a “Social Impact Assessment” form which includes:

- A description of the event with probes to identify relationship (specifically a causal relationship) of the event to the participant's involvement in study.
- Coding of the type of event
    - Police/legal problem
    - Housing
    - Employment
    - Health care/insurance
    - Friends/Family
    - Other
- The date at which the event occurred
- If possible, the participant's assessment of the degree to which the event has impacted on his/her quality of life. However, this will not be possible in cases of death, arrest and incarceration in which the participant is unavailable for interview.
- Description of what was done by the study staff and participant to address the event
- Current status of the event and how it was resolved.

AEs and SAEs will be reported to the PI within 24 hours orally or by email and a completed form sent to the PI within 72 hours. A copy of the report will be sent within the NIH project officer and the IRB overseeing the study within one week of completion of the form.

Report of Changes or Amendments to the Protocol. Plans to change or amend the protocols will be reviewed by the Rutgers University IRB. The designated NIH Project Officer will be informed about the approved changes or amendments.

Plans for Interim Analysis of Efficacy data /Trial stopping Rules. Not applicable.

Conflict of Interest. All study investigators are required to complete annually a statement of conflict of interest that is monitored by the IRB.

B. Data/Safety Monitoring Board Details

This is not a phase III clinical trial therefore a DSMB will not be established.

6.4 Reporting Results

A. Individual Subjects' Results

N/A

B. Aggregate Results

At the end of the study, we will share main findings with members of the CAB and a brief report with participants electronically.

C. Professional Reporting

Results will be presented at peer-review journals and academic conferences.

D. Clinical Trials Registration, Results Reporting and Consent Posting

ClinicalTrials.gov ID: NCT04166851

6.5 Secondary Use of the Data
N/A

UPLOAD to e-IRB Section 15 Miscellaneous – lab certifications, if applicable.

7.0 Research Repositories – Specimens and/or Data

N/A

8.0 Approvals/Authorizations

Johns Hopkins Bloomberg School of Public Health IRB Approval: IRB00008650, expiration date: 12/7/2022.

UPLOAD a copy of all approvals and agreements to e-IRB Section 15.0 Supporting Documents.

9.0 Bibliography

1. White JJ, Mathews A, Henry MP, et al. A Crowdsourcing Open Contest to Design Pre-Exposure Prophylaxis Promotion Messages: Protocol for an Exploratory Mixed Methods Study. *JMIR research protocols.* 2020;9(1):e15590.
2. Falk EB, O'Donnell MB, Tompson S, et al. Functional brain imaging predicts public health campaign success. *Social cognitive and affective neuroscience.* 2016;11(2):204-214.
3. Falk EB, Berkman ET, Lieberman MD. From neural responses to population behavior: neural focus group predicts population-level media effects. *Psychological science.* 2012;23(5):439-445.
4. Burns SM, Barnes LN, McCulloh IA, et al. Making social neuroscience less WEIRD: Using fNIRS to measure neural signatures of persuasive influence in a Middle East participant sample. *Journal of personality and social psychology.* 2019;116(3):e1.
5. Kaye S-A, White MJ, Lewis I. The use of neurocognitive methods in assessing health communication messages: A systematic review. *Journal of Health Psychology.* 2017;22(12):1534-1551.