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Induced Negative Subliminal Reactions to Radical Media and Propaganda: Countering Recruiting Efforts in a Congested Media Environment

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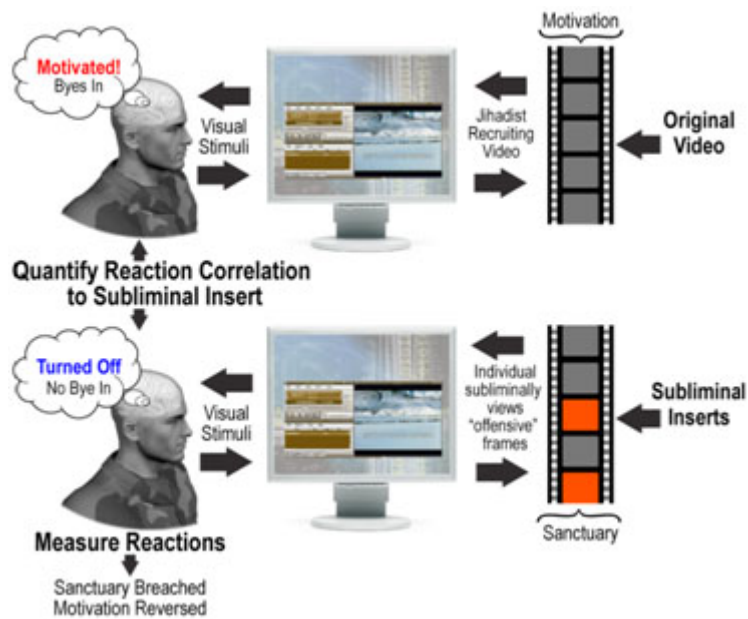
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Problem and Desired Outcome

The adversaries to the United States have used Psychological Warfare tactics skillfully to recruit individuals to join their group or to incite them to act in sympathy with their cause against the U.S. and its allies. Much of this activity has found a safe haven on the Internet where the protagonists can find sanctuary and operate with relative safety and anonymity on a global scale to influence susceptible people. Their tools include propaganda—material designed to increase the level of hatred against their enemies—as well as more specific recruiting, instructional and general preparatory material to promote and facilitate actions against the U.S., their allies, and national interests. This has resulted in Social Media becoming a powerful tool to recruit “foreign fighters” as well as to persuade groups and individuals to perform terrorist acts in their own homeland – with or without direction. It is our proposal to develop cognitive-based countermeasures to undermine the effectiveness of the propaganda and to hence reduce the capability of the use of internet sites in particular to recruit.

The Technology

We propose to link modern technology with cutting edge scientific knowledge to provide countermeasures to the stated problem. The team’s research has already shown that by using non-focal negative image biases processing of an attended to positive image in brain systems known to be involved in the evaluation of stimuli (i.e., the amygdala and orbitofrontal cortex). The program’s research will continue this work to move toward subliminal presentations and form the basis for subliminal dissuasion (and persuasion) tool development. We shall investigate, develop and validate effective material using emotional dissuasion (and persuasion) techniques to identify that dissuasion (or persuasion has occurred). We will apply this subliminal material to specific Internet based media environments.



Induced Negative Subliminal Reactions to Media

Additionally, there are other avenues of application depending upon needs. These tools will go into the existing Influence Operations and Unconventional Warfare inventory and can be applied not only overseas, but could potentially be used to counter recruitment and radicalizations efforts in the United States. This Program will produce early operational capability, the Team will be extremely sensitive to unintended consequences (e.g., strengthening as opposed to negating). A reliable subliminal method, including both the technology and the messages will be developed; it will then be validated by unobtrusively measuring the effectiveness in a target person or group. The operational material will be developed and tested on people with different racial, religious, ethnic, and other characteristics. After this testing has been completed the Program will be moved to the operational phase when “inserts” will be developed for targeted social and other media sources and inserted into those sources. Our approach will be a “spiral development” model allowing us to operationalize output as it is developed and not wait until all of the research is completed. We believe this would be interagency in scope (e.g., DoS Global Engagement Center, DHS, and NCTC among others).

Hypothesis

The intended outcome of the Program (our hypothesis) is that the effectiveness of the media used by the adversary will be subverted and their message will be mitigated, or even reversed, and their Internet-based efforts eroded. Should adversaries discover that this is being done, they will start to lose confidence in this critical avenue for recruiting and radicalization and hence the overall objective of effective recruitment.

Methods Used and Progress (in Phases)

Phase I – Develop Test Protocols and Materials, perform literature review and obtain IRB approval

All of the studies proposed have been investigated and there is literature and data that solidly supports our concept; although, this specific application has not been fully investigated. The following are the actions that the team will take to produce the baseline media, to develop “inserts,” which initially would be images inserted into media such as a web site and to test the effects of those “inserts.” All of the test subjects will be drawn from the researchers own institutions. There will be no attempt in Phase I to replicate the eventual target audience. It is not necessary because the basic affective principles underlying

the proposed effects generalize to any population.

Approval for the use of human subjects will be obtained from the appropriate Office at the institution and the IRB process will be adhered to.

Background literature and additional research. Most current models of social cognition suggest that many aspects of emotional processing occur automatically and outside of conscious awareness. For example, neuroscience studies have shown that emotional responses to stimuli can begin less than 200 milliseconds following stimulus presentation. This suggests that emotional processing can begin prior to full detection and awareness of an evoking stimulus. Given that stimulus identification is not necessary for emotional processing, subliminal presentations of stimulus should be able to activate emotional responses without a person knowing. Indeed, research on affective priming has shown that subliminal visual presentations of words with positive or negative connotations can have dramatic influences on subsequently presented words.

These influential studies clearly indicate that emotional evaluation can occur not only unconsciously, but can have effects on the processing of other emotional information and actually behavioral responses. More recent work has validated aspects of subliminal presentation using neuroscience methods. Subliminal presentations of faces conveying fear activate the same regions of the brain (specifically, the amygdala) than when presented supraliminally (when participants can see the images). Results suggest that subliminal presentations can activate brain systems associated with emotion even when people have the specific conscious goal not to have such a response.

These previous studies provide a firm groundwork for the investigation of subliminal presentation in the context of counter-persuasion. The research proposed in Phase 1 will examine how specific subliminal emotional stimuli can alter on-going emotional experience. We shall also develop the most effective stimuli in terms of content and placement. The research proposed in support of this Program will explicitly examine effects of conflict between subliminally activated emotion with emotional information consciously available. Unlike previous research, different aspects of subliminal emotional induction will be examined (e.g., disgust versus fear versus anger) to determine whether specific emotions can be induced. Initial studies will use general inductions of emotion that are likely cross-cultural valid, and once demonstrated, will move toward culture specific inductions.

The Program will begin with more simple examinations and will build toward more complex applications. In the first set of studies, subliminal stimuli will be static images and words and their effects will be examined against other static images. Paradigms like this have been used successfully in previous research and we anticipate robust effects. Once the neural signatures of subliminal presentation have been documented, the research will move toward embedding subliminal images within full motion ads (although described below, not priced in this proposal).

Deliverable: The deliverable for Phase I are a literature review, test plans, IRB approval, and operational media to be tested in Phase II.

Go/No-Go (At the conclusion of every Phase): The decision will be based on acknowledgement that the Team meets the objective that there will be measurable outcomes based on the literature review and that IRB approval is obtained to cover the work required.

Phase II - Run Local Subjects

The cognitive neuroscience research component of this Phase will be conducted in a series of studies. The goal of each study is to develop and validate the most effective means of subliminal presentation and

ensure that desired emotional responses are evoked. By the end of each study (and as new developments occur), deliverable information regarding effective strategies will be conveyed to the operational team. By taking an incremental stepwise approach, the Team will ensure that deliverables can be generated quickly, but can also be updated as soon as new information is available.

We shall employ a common set of methods will be used across studies to bolster claims and refine methods. Specifically, each study will include functional magnetic resonance imaging (fMRI), electrograph recording (EEG), Facial Electromyography (EMG), and psychophysiological measurements. fMRI data will provide detailed information regarding the specific brain processes involved in the processing of the subliminal stimuli and can verify that proposed emotional systems become active in the desired fashion. EEG data provides real time (in the order of milliseconds) temporal information to time lock these effects so the we can understand the time that it takes to process the subliminal stimulus and the time that it takes to alter an emotional response.

Psychophysiological measures will be used to examine the arousal state of participants. These studies will allow for validation of changes in bodily emotional responses following stimulus presentation. Facial EMG will be video recorded to analyze moment by moment positive and negative emotional responses as revealed by facial muscles throughout the sessions. A goal of this multi-method approach is, after validating and optimizing the stimulus presentation methods, to undercover bodily signals that co-vary with our desired emotional responses that can be used for field research and experimentation. To the extent that these implicit signals can be used to identify an emotional or cognitive response (validated by the neuroscience), field-ready observations can be made. Once markers of involuntary emotional leakage have been documented, further research using digital video recorders will be used to accurately measure the emotional reaction of the subjects, especially in cases when neuroscience recordings are either impossible or not practical (e.g., international samples).

An important aspect of the procedures is that they will allow us to examine and understand how unconscious emotions blend and transform consciously experienced emotions. It is expected that some emotions may cancel each other out (e.g., calm and fear), whereas others may combine and intensify (e.g., fear with disgust may result in hatred). Because these blends appear not to be studied in detail and also no known work has examined blends that are the result of conscious and unconscious emotion, Phase I work is critical to develop the most effective combinations of emotional blends and to determine the ones that may amplify in unintended and counterproductive ways. Phase II will result in critical findings and material that will be passed to operations immediately.

Subliminal induction of specific emotions. Study participants will be told that they are engaged in a study dealing with visual preference and emotions. In this task, they will be asked to judge abstract and novel line drawings for their emotional context. The participants will be told that people are quite good at detecting the emotional qualities of abstract line drawings and that they are to select which emotional state they feel when looking at the image (e.g., fear, joy, anger, disgust, calm) with a button press. Preceding each image will be a subliminal presentation of a word (Study 1a) or picture (Study 1b). The subliminal stimulus will be presented for 30 milliseconds and masked with a checkerboard to ensure that participants can not see the image. Immediately following the subliminal stimulus, the abstract will be presented and participants will make their judgment. Further, to directly examine whether specific emotional responses can be elicited (something which previous research has not yet tested), subliminal stimuli will be selected to convey different emotions (e.g., fear, joy, anger, disgust, or calm). Because the line drawings in fact evoke no emotion, any emotion experienced necessarily must be caused by the subliminal image, thus any differences in the fMRI, EEG, or psychophysiological data must be a marker of subliminal induction of emotion. Control conditions which use supraliminal stimuli in place of subliminal stimuli will be used to

verify that observed activations are the result of emotion and that the unconscious emotion resembles the conscious emotion. These results will be critical for the interpretation of the remaining studies throughout the Program by providing markers of specific emotional activations. The results will also provide information about which emotions can and which emotions cannot be activated unconsciously. For example, there is a suggestion that fear and anger may be more readily unconsciously activated than disgust. The team will test standardized stimulus materials in order to generate materials that will have the broadest impact. Standardized stimuli will be examined for their capability to activate universal emotional responses, irrespective of the subjects' cultural and racial background. For example, most people have a sense of calm when viewing a sunset, and most people have a sense of disgust in seeing a decaying body or feces. The studies will be directed to determining the religious, ethnic, regional, class, and other characteristics which may alter the effectiveness of the material.

The effects of subliminally induced emotion on conscious emotion. Study 2 of Phase 1 expands on the findings of Study 1 (a and b) by explicitly examining how the subliminal induction of emotion influences the processing of consciously available emotional information. In Study 2, the same subliminal presentation procedure as Study 1 will be used. However, rather than responding to an abstract image, participants (OSU students) will make judgments about emotional valenced stimuli. Specifically, the same picture and word stimuli that will be used as subliminal images will be presented supraliminally following the subliminal presentation and participants will indicate whether the image is something positive or negative (Study 2a) or the specific emotion that it conveys (Study 2b). With this design, each emotion can subliminally precede each of the other emotions and the influence of unconscious emotion on conscious emotion can be directly examined. As in Study 1, supraliminal stimuli in place of subliminal stimuli will be used as controls.

To the extent that a mismatch between stimuli results in decreased emotional processing, the Team should observe activation in the anterior cingulate and prefrontal cortices in the fMRI study. These regions have previously been implicated in emotional conflict and the regulation of emotional experience. In contrast, if the match between subliminal and conscious emotion results in an amplification of emotional experience, then greater activity should be observed in areas such as the amygdala and insular cortex (two regions typically associated with emotional experience). Similar effects should be observed in the EEG data—a waveform that begins 300ms following stimulus presentation is the canonical marker of conflict in the brain. Lastly, psychophysiological measures should directly index the increase or decrease in emotion in sympathetic and parasympathetic activity. In addition, each of the combinations of emotions can be compared and examined to determine which emotions cancel each other out, and which result in amplifications (e.g., does a specific combination of two emotions result in increased anger?).

The effects of subliminally induced emotion of persuasive appeal. In Study 3 in Phase 1, subjects will participate in studies concerning “persuasive advertisement.” In these studies, students will watch a series of commercials taken from basic cable programming (e.g., McDonald’s ads, cellular phone ads). Both positive (attempts to generate positive attitudes, such as toward products) and negative (attempts to generate negative attitudes, such as toward cigarettes or drunk driving) ads will be selected. Within some ads, subliminal images will be “inserted.” One quarter of ads will remain untouched, one quarter will have a same-valence “insert” (positive image during a positive message), one quarter will have a contra-valence insert (negative image in a positive message) and one quarter will have a contra-valence insert (positive image in a negative message). To ensure strict experimental control, each selected video will be used for each experimental condition across participants (so that no effects can be attributed to a particular video). Following each 30 second video presentation, students will rate the video on the following dimensions: valence (positive to negative), arousal (non-excited to very excited), and persuasiveness (not at all to very). To the extent that the subliminal presentations affect attitudes, the Team expects to find differences

on each of these measures (though persuasiveness may be the most important).

To further validate self-reports, EEG, fMRI, and psychophysiological brain recordings will be collected. In the psychophysiological portion of the study, electrical signals from the brain will be collected as well as peripheral measures of arousal and emotion. In the fMRI portion, detailed analyses of brain activity will be recorded to ensure processing of the subliminal messages. These two methods complement each other by providing detailed temporal timing (EEG/ psychophysiological) and spatial brain activity (fMRI) information.

Deliverable: The deliverable for Phase II are the comprehensive data derived and collected from the studies conducted in the Phase.

Go/No-Go (At the conclusion of every Phase): The decision will be based on acknowledgement that the Team meets the objective useable data were obtained and that there were measurable outcomes in line with the stated goals.

Phase III – Analyze Data and Write Final Report

The analysis of the data will not only demonstrate the feasibility of the persuasion program, but will also provide the analytic tools and algorithms necessarily for optimizing all future implementations. The characteristics of effective “inserts” will defined and their effects, both intended and unintended, will be described, the information will presented in the final report in a form to be passed from the research and development team to the operational team. In addition, to data regarding the insert, the Team will also provide measurement information and techniques. The final report will provide definitive information and analysis of the effectiveness of using subliminal techniques to affect the acceptance of (positive) recruiting messages.

Deliverable: The deliverable for Phase III is a series of detailed reports on each study, and media “Influence Tools” for operational use by the customer organizations.

Phase IV – Design and Develop the Tactics, Techniques, and Procedures (TTPs) for Operational use.

NOTE: Without the studies and analysis performed in the first three phases is impossible to adequately scope and price of a final Phase. This Phase is notional and may be discussed should a full proposal be requested. This Phase will provide a proof of concept for transition to operational use.

We shall work in close collaboration with the government partners to identify a source of cultural and linguistic resources with a broad range of racial, religious, and regional attributes and the same demographics as the target audience. This phase will be fire-walled from most of the Team performing the Phase I through III studies and analysis. Only key personnel will participate in both Phases. We shall show test media to subjects and measuring their reactions, which may be done undetected by means of a camera and remote evaluation, and hence develop a catalogue of targeted media.

Development and use of specialized stimulus materials. Following the successful development of universal inserts, culturally-specific “inserts” will be developed. Although the universal “inserts” likely will have broad effects, more targeted emotional responses can be evoked by specific cues. These “inserts” will be developed in collaboration with cultural advisors and testing will be conducted through participants identified by the Team. Whereas the universal “inserts” will be tested extensively using neuroscience methods, these tests will be conducted using the implicit leakage indices developed as part

of this proposal. This approach will allow for more data collections at more sites to test specific cultural responses.

In Phase IV, we will perform the research planning and work with the government entities which would be able to apply the proposed techniques and other measures against the adversary primarily in Internet space.

In the execution plan for the Program the activities under Phase IV will be kept separate from the activities of the prior phases. The tools and techniques developed in the initial phases will be transferred to the Phase IV team. It is also conceived that this team will be able to use material and techniques developed by other government agencies, and that the proposed operation will provide significant IO and PSYOPS support and execution capability.

The policy and approval process for this type of activity are well established, the approval process includes the determination that it is essential to limit access to the information. This pre-approval process will set guidelines and parameters and will be submitted to the NSC for approval and ultimately to the President for signature. We understand the process and can meet the requirements.

Deliverable: The deliverable for Phase IV is a proposed operating structure addressing CONUS and OCONUS components, funding mechanism, staffing proposal, and a business plan.

Proposed Way Ahead

This proposed effort is a twenty one month effort with go no-go reviews at the end of each phase. Following the initiation of the research group, the first three months will be needed for stimulus generation and testing, and acquiring all necessarily institutional approvals (Phase I). In the next nine months, data collection will be completed for the Phase II studies. Although this is an accelerated time frame for this number of studies, two full time employees will dedicate their time to data collection and maintenance. Data collection and processing will begin as soon as data begins to be collected. That said, to optimize the analysis stream and to provide more confident interpretations, Phase III consists of nine months of data analysis and interpretation. Again, this accelerated time frame will be made possible by the two full time staff members

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