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14. ABSTRACT This year, we prepared to launch the NORTH STAR (***N***ew ***O***rientation for ***R***educing ***T***hreats to ***H***ealth from ***S***ecretive ***P***roblems ***T***hat ***A***ffect ***R***eadiness) initiative. NORTH STAR is a large, randomized, controlled trial. It addresses Air Force Community Assessment data indicating 1 of 3 Airmen anonymously report the presence of problem behaviors: substance abuse, suicidality family violence. These problems are typically hidden by AD members and their families. NORTH STAR provides commanders the ability to assess unit members' resilience and problem behaviors and to bring simple, measurable interventions to optimize functioning. Specifically, we created a streamlined needs assessment and are currently finalizing the NORTH STAR Guidebook of evidence-based interventions. We have completed Air Staff briefings and received endorsement and support from AF Integrated Delivery System [IDS] (prevention board for the AF). The team has finalized the process for recruiting and training Squadrons. We are engaging with the AF to finalize plans for data collection to begin.

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1. INTRODUCTION

Problematic alcohol use, suicidality, and family maltreatment among active duty (AD) members of the U.S. military share several common traits: they are prevalent, with at least 1 out of 3 AD members anonymously reporting at least one of these problems at a severe level; they share risk and protective factors; they are costly, both in dollars required to handle incidents that come to light and in reduced readiness; they are heavily influenced by social factors, thus necessitating a community-level response; and their presence often overlaps in affected military families. Despite all of this, at the individual level, their existence is typically hidden by both AD members and their families, and thus they are "secretive problems". This is not to imply that their existence in the military population is a secret. The problems are not secret from military leadership, who have identified them as key targets for improved community health and have dedicated considerable resources to prevent and treat them. The problems are not secret from unit commanders, who list them among their top concerns. The problems are not secret from affected members' units, who bear the brunt of the morale and readiness degradation that are the common fallout of such problems. However, individuals, including AD members, typically try to keep these problems secret from their fellow unit members, who may only learn that a member has a problem after a serious incident (e.g., suicide attempt, partner abuse arrest, DUI charge). NORTH STAR (*N*ew *O*rientation to *R*educe *T*hreats to *H*ealth from *S*ecretive problems *T*hat *A*ffect *R*eadiness) is a research-based, empirically-guided community intervention system designed to prevent secretive problems. NORTH STAR was developed, refined, and tested through an ongoing collaboration with the US Air Force that has spanned over two decades. In the first rigorous trial of NORTH STAR, the prevention system was implemented at the level of the base by the local Integrated Delivery System (IDS). Positive impacts were observed for NORTH STAR, but several opportunities for change were identified. Based on the findings of that trial, we modified the approach, and refocused NORTH STAR on unit leaders. The new version of the NORTH STAR prevention system brings unit-relevant, easy to understand information to leaders on a regular basis about secretive problems and modifiable risk and protective factors related to those problems. NORTH STAR steps leaders through a streamlined process to use survey data to prioritize risk/protective factors, to identify empirically-supported activities to reduce risk and increase resilience, and to evaluate and refine the implementation of prevention activities within their units. Ongoing consultation and support reinforces training and assists in implementation with the goals of promoting mastery of the use of the system within the unit and of building the sustainability of unit-focused prevention efforts. Through strengthening the processes through which unit leaders are informed of practical, science-based knowledge and intervention and providing guidance in implementing such interventions, we hypothesize that we will significantly increase the effectiveness and improve the efficiency of ongoing resilience building efforts in the Air Force. In this second trial of NORTH STAR, we tested the effectiveness of the program delivered within squadrons, and examined potential mechanisms through which identified positive effects were achieved.

2. KEYWORDS

United States Air Force, substance abuse, suicidality, family maltreatment, community assessment, risk and protective factors, resilience, prevention systems, evidence-based preventive interventions, longitudinal, latent growth curves, multilevel analyses, installations, squadrons, commanders.

3. ACCOMPLISHMENTS

What were the major goals of the project?

Status	Goal
	1. Perform preparatory tasks necessary to conduct randomized, controlled trial.
Completed	1.1. Obtain all necessary approvals, program website, finalize assessment, coordinate with AF and MOMRP POCs as needed to launch study.
Completed	1.2. Finalize IRB approvals from New York University (NYU), USAF, and DoD as required.
Completed	1.3. Complete Air Staff and MAJCOM briefings.
Completed	1.4. Recruit 25 AF squadrons
Completed	1.5. Final pre-launch update NORTH STAR Guidebook.
Completed	1.6. Update programming and scoring syntax for final AF streamlined needs assessment.
Completed	1.7. Program process survey.
Completed	1.8. Attempt to recruit 136 new squadrons on 6 installations where work is currently planned.
Completed	1.9. Continue to work with AFMOA and attempt to recruit other new squadrons from other installations.
Completed	1.10. Recruit 50 AF squadrons
Completed	1.11. Obtain MOUs from participating squadrons on the 6 aforementioned installations (N = 108).
Completed	1.12. Obtain MOUs from other new squadrons generated through the work with AFMOA.
Completed	1.13. Conduct squadron, installation, and MAJCOM briefings.
	2. Specific Aim #1: Conduct randomized, controlled trial of NORTH STAR to determine its effectiveness in reducing alcohol problems, prescription drug misuse, suicidality, partner abuse, and child abuse.
	2.1. Collect pre-intervention data.
Completed	2.1.1. Collect initial wave of process evaluation survey.
Completed	2.1.2. Conduct baseline needs assessment survey.
	2.2. Conduct randomized controlled trial (RCT).
Completed	2.2.1. Randomize participating squadrons.
Completed	2.2.2. Notify squadrons of their intervention/control status.
Completed	2.2.3. Schedule training calls with intervention squadron teams.
Completed	2.2.4. Analyze needs assessment data.
Completed	2.2.5. Produce feedback reports and publish to the web.
Completed	2.2.6. Conduct trainings and complete implementation plans.
Completed	2.2.7. Assist squadrons in executing implementation plans.
Completed	2.2.8. Conduct first community resource documentation interviews.
Completed	2.2.9. Update Guidebook
Completed	2.2.10. Refine NORTH STAR planning materials to reflect initial implementation planning experience.
Completed	2.2.11. Conduct six-month needs assessment survey.
Completed	2.2.12. Schedule six-month implementation planning calls (i.e., similar to the training calls, but with less training and more consultation) with

		intervention squadron teams.
Completed	2.2.13.	Analyze six-month needs assessment data.
Completed	2.2.14.	Produce six-month feedback reports and publish to the web.
Completed	2.2.15.	Conduct six-month consultation calls and complete revised implementation plans.
Completed	2.2.16.	Assist squadrons in executing implementation plans.
Completed	2.2.17.	Update Guidebook
Completed	2.2.18.	Conduct 12-month process evaluation assessment.
Completed	2.2.19.	Conduct 12 month needs assessment survey.
Completed	2.2.20.	Schedule 12-month implementation planning calls (i.e., similar to the training calls, but with less training and more consultation) with intervention squadron teams.
Completed	2.2.21.	Analyze 12-month needs assessment data.
Completed	2.2.22.	Produce 12-month feedback reports and publish to the web.
Completed	2.2.23.	Conduct 12-month consultation calls and complete revised implementation plans.
Completed	2.2.24.	Assist squadrons in executing implementation plans.
Completed	2.2.25.	Conduct second community resource documentation interviews.
Completed	2.2.26.	Update Guidebook
Completed	2.2.27.	Conduct 18-month needs assessment survey.
Completed	2.2.28.	Schedule 18-month implementation planning calls (i.e., similar to the training calls, but with less training and more consultation) with intervention squadron teams.
Completed	2.2.29.	Analyze 18-month needs assessment data.
Completed	2.2.30.	Produce 18-month feedback reports and publish to the web.
Completed	2.2.31.	Conduct 18-month consultation calls and complete revised implementation plans.
Completed	2.2.32.	Assist squadrons in executing implementation plans.
Completed	2.2.33.	Update Guidebook.
Completed	2.2.34.	Conduct 24-month process evaluation assessment. (as possible given when units enrolled in study)
Completed	2.2.35.	Conduct 24-month needs assessment survey. (as possible given when units enrolled in study)
Completed	2.2.36.	Schedule 24-month implementation planning calls (i.e., similar to the training calls, but less training and more consultation) with intervention squadron teams as desired (as this is the final round of data collection, continued implementation planning is not required of any squadrons.). (as possible given when units enrolled in study)
Completed	2.2.37.	Analyze 24-month needs assessment data. (as possible given when units enrolled in study)
Completed	2.2.38.	Produce 24-month feedback reports and publish to the web. (as possible given when units enrolled in study)
Completed	2.2.39.	Conduct 24-month any scheduled consultation calls and complete revised implementation plans. (as possible given when units enrolled in study)
Completed	2.2.40.	Conduct final community resource documentation interviews. (as possible given when units enrolled in study)
Completed	2.3.	Integrate and clean longitudinal needs assessment data set.

Completed	2.4. Integrate and clean longitudinal process evaluation data set.
Completed	2.5. Prepare community resource documentation data for analysis.
Completed	2.6. Conduct analyses as detailed in data analytic plan
	3. Specific Aim #2: Apply recent advances in social network science to test the networking mechanisms hypothesized to be partially responsible for the effects of NORTH STAR on behavioral health.
Partially Completed (due to lack of permission to collect all needed data)	3.1. Conduct social network descriptive analyses and incorporate social network variables into needs assessment dataset.
Partially Completed (see above)	3.2. Conduct analyses as detailed in data analytic plan.
	4. Specific Aim #3: Determine how effective NORTH STAR is in promoting health of recently deployed troops by (a) exposing them as individuals to empirically supported interventions aimed at common risks (e.g., depressive symptoms, post-traumatic stress symptoms) and (b) exposing one important aspect of their social network — their squadron — to those same interventions. We hypothesize direct (as a function of their own participation) and indirect effects (through the participation of their network) on health.
Completed	4.1. Conduct analyses as detailed in data analytic plan.
	5. Report results.
Completed	5.1. Conduct progress briefings with Air Staff and MAJCOMs twice annually.
Completed	5.2. Conduct final briefings.
In Progress	5.3. Write scientific papers.
Completed	5.4. Finalize Guidebook and all other materials; finalize automation of feedback reports to support dissemination.
Completed	5.5. Write final reports.

What was accomplished under these goals?

Goal 1

The NORTH STAR trial was funded as a five-year project in 2011, but due to delays in approvals (see discussion in "Changes/Problems" section below), continued for a total of 8 years. Ultimately, there were three phases of the study: (1) study preparation, (2) NORTH STAR in Units, and (3) NORTH STAR in True North. Study preparation took over four years due to the aforementioned delays. When the data collection for the study was finally launched in 2016, the focus was on recruiting AF squadron commanders from any AF base, as was specified in the original design (i.e., NORTH STAR in Units). In the midst of this work, the Vice Chief of Staff for the AF launched a new prevention initiative, Task Force True North. The Task Force expressed interest in NORTH STAR, and eventually decided to include NORTH STAR in their new multimodal True North Strategy that was soon to be launched on selected "beta-test" installations. At this point, the focus of the NORTH STAR trial shifted to wrapping up work with the 20 squadrons that had enrolled during Phase 2, and then enrolling and working with squadrons from the 7 installations that were designated to participate in the work of Task Force True North (i.e., NORTH STAR in True North).

Phase 1: Study Preparation

While required approvals were being obtained, the version of the NORTH STAR Prevention System to be used in the current trial was finalized. Web-based versions of the key parts of the system were developed, tested, and refined, including the NORTH STAR Survey (see description under Goals 2 through 4 below), the NORTH STAR Commander's Dashboard, and the NORTH STAR revised and updated Guidebook of Evidence-Based Interventions.

NORTH STAR Prevention System

The NORTH STAR Prevention System is a community-based preventive intervention. It was originally designed to be delivered on an entire base through the work of the local IDS. For this trial, it was modified to be delivered at the squadron level. The system is delivered by a trained and supervised NORTH STAR Guide, who has experience in the prevention of mental health and related adjustment problems, and works on an ongoing basis with the squadron commander and his/her leadership team. The four components of NORTH STAR are as follows.

Assessment Component. Airmen within units are surveyed with the NORTH STAR Survey regarding specific secretive problems, namely alcohol misuse, domestic violence, and suicidality, as well as risk and protective factors related to those problems. Surveys are completed anonymously. The primary purpose of the NORTH STAR survey is to inform and engage commanders and other unit leaders into taking action on behalf of their Airmen in terms of building and supporting resilience and wellbeing and preventing secretive problems and their aftermath.

Commander's Dashboard Component. Squadron commanders and other commander-chosen leaders receive unit survey results. Levels of problems and risk and protective factors in the unit are compared to AF-wide levels. The dashboard is provided in on-line and PDF formats.

Prevention Action Planning Component. Based on what they see on their Dashboard, commanders are asked to choose the specific problems, and the risk and protective factors related to those problems, that are of most concern to them regarding their unit. Information about "light touch" preventive interventions that address the chosen risk and protective factors and that have been shown to be helpful within the context of rigorous research studies (i.e., "evidence-based" interventions or EBIs)

is provided via a project website. Most of these interventions are free smart phone apps or websites. Commanders are invited to select several interventions to implement within their squadron.

Prevention Implementation Component. Squadron Commanders and designated leaders take action within their squadron to decrease risk and improve protection. Interventions are disseminated to unit members, and are accessed by Airmen anonymously. The entire process repeats in 6 months to determine the impacts of the actions that were taken and to decide whether different actions are required to decrease risk and increase protection amongst the members of the unit.

In short, NORTH STAR is intended to provide a complimentary, anonymous route for Airmen to begin to address problems such as alcohol misuse, domestic violence, and suicidality, and precursors to those problems. This alternative approach may ultimately lead some Airmen who need more extensive assistance and support to reach out and get it, whether from their fellow squadron members, or from professionals on their base or in their community. Importantly, NORTH STAR provides squadron commanders with access to information on their entire squadron -- not just on those individuals that they already know have problems -- and provides them with the most up-to-date, research-based information available about "light touch" steps that they can take to help their Airmen begin to address specific challenges that they are facing.

Phase 2: NORTH STAR in Units

During this phase, squadrons were recruited from bases across the AF. Individual squadron commanders expressed interest, and if they consented to participate, their squadron was randomized into the NORTH STAR Intervention condition or the Control condition. Commanders in the Intervention condition received the NORTH STAR Prevention System. Commanders in the Control condition received reports on survey results only. Twenty squadrons were enrolled during this phase. Differences between the control and intervention squadrons at the second assessment point (i.e., Time 2) -- after initial intervention -- were examined near the end of this phase, and results were promising (see Table 1 below). Work with these squadrons (i.e., additional assessments and ongoing intervention) continued until the end of the project.

Table 1. ***Time 2 Differences Between Conditions***

	Intervention	Control	*d*†
Participation			
Participants per Squadron (Mean)	57.2	38.9	0.52
Participation Rate	31.2%	19.6%	0.53
Secretive Problems			
Hazardous Drinking Rate	6.1%	9.1%	-0.66
Suicidality Rate	3.5%	5.3%	-0.49
Partner Emotional Abuse Rate	10.3%	11.1%	-0.13
Risk & Protective Factors			
Depressive Symptoms	1.72	1.58	0.91
Intimate Relationship Satisfaction	3.77	3.78	-0.02
Financial Stress	0.75	0.84	-0.54

Coping	2.32	2.41	-1.35
Parent-Child Relationship Satisfaction	4.96	4.93	0.12
PTSD Symptoms	1.68	1.56	0.55
Insomnia	2.73	2.74	-0.05
Anger	1.94	1.80	0.57
Resiliency	2.51	2.65	-1.02

Note. †Cohen's *d* is a standardized effect size expressing the difference in means in (Time 1) standard deviation units. Heuristically, small, medium, and large effects are reflected by absolute *d* values of .3, .5., and .8, respectively.

Phase 3: NORTH STAR in True North

During the final phase of the project, while work wrapped up with the first 20 squadrons, recruitment shifted to focus on squadrons from the seven Task Force True North bases, most of which had one wing but some of which had two wings. As directed by AF leadership, for the purposes of this project, three bases were assigned to receive the True North Strategy, including NORTH STAR, and four bases were assigned to Control (i.e., no NORTH STAR, and 3 of the 4 bases were assigned no True North Strategy component at all). Further, as directed by AF leadership, Control bases during this phase received NORTH STAR unit-focused dashboards only at the end of the study, rather than after each assessment point as in Phase 2. On a given base, the number of squadrons within a wing that participated was determined by the wing commander, but then designated commanders had to agree to participate as well. Within most wings, most squadrons participated. The first assessment was conducted before any True North initiatives, including NORTH STAR, were delivered on a base. After the initial assessment, the rest of the NORTH STAR Prevention System was conducted with participating squadrons on the three True North "Intervention" condition bases. After NORTH STAR was launched on an Intervention base, the other components of the True North Strategy began to be delivered on most Intervention bases at some point between Time 1 (baseline) and Time 3 (one year later), with most coming on line between Time 2 (6 months post-baseline) and Time 3. Unfortunately, project funding was exhausted at this point so additional assessment and intervention activities were not able to be conducted.

True North Strategy

True North activities on each Intervention base were overseen by a True North POC, who reported to a True North POC located in the Integrated Resilience Office within the Office of the Vice Chief of Staff at AF headquarters (HAF). Each of these POCs were civilians, but most had served in the military at some point in their career. The True North Strategy comprises two types of initiatives: universal initiatives (those directed to all squadrons) and selective initiatives (those directed at squadrons whose members are at elevated risk for decreased wellbeing and resilience and increased negative outcomes). The universal initiatives, for all squadrons on an installation, include the following.

(1) The NORTH STAR Prevention System, described above.
(2) Onboarding activities for new unit members on a base, including a Welcome Center for initial processing and orientation, and sponsorship (i.e., "welcome mentors") for both Airmen and their family members.

The selective initiatives, delivered only to specific squadrons within an installation, include the following.

(1) An "embedded" mental health provider team, including licensed clinical social workers and mental health technicians, that were assigned to serve identified "high risk" units.
(2) A religious support team, including a chaplain and chaplain assistant, that was assigned to serve identified "high risk" units.
(3) An operational support team, including a physical therapist, exercise physiologist or certified athletic trainer, a clinical psychologist, a clinical social worker, a human performance integrator, and a data manager. This team rotated around a base, staying with a targeted unit to conduct assessments and make recommendations for a set period of time (e.g., 6 weeks).

Goals 2 through 4

Data used to examine the findings from Goal 2 to 4 were drawn from Phase 3 of the project (described in the Goal 1 section above). Analytical methods and results are presented below.

Participants

Members of 180 squadrons from 7 installations participated in three online surveys across a time period of one year (i.e., baseline, 6-month follow-up, 12-month follow-up). The number and characteristics of participants by each wave are reported in Appendix C Table 1.

Assessments

At each of the three waves of assessment (Time 1 or T1, Time 2 or T2, and Time 3 or T3), participants completed the NORTH STAR Survey. The survey was constructed with items utilized in prior AF Community Assessment Surveys (used around the time of the start of this project, in 2011 or before), and comprises brief questionnaires measuring three secretive problems (suicidality, partner maltreatment, and alcohol misuse), nine research-based risk and protective factors for those secretive problems, and a small number of demographic questions. The questionnaires used in the NORTH STAR Survey are described below.

Secretive Problem Measures

Alcohol misuse was measured with 10 items from the World Health Organization Alcohol Use Disorders Identification Test (AUDIT). The focus of the questions is on the quantity, frequency and consequences of drinking alcohol.

Partner maltreatment was measured with 4 items from the Partner Psychological Abuse Screener. The focus of the questions is on emotional abuse by a partner towards the unit member, and includes aggressive acts (e.g., humiliation) as well as consequences related to those acts (e.g., fear).

Suicidality was measured with 4 items from the Youth Risk Behavior Surveillance System. The focus of the questions is on suicide consideration, planning, and attempt(s).

Risk and Protective Factor Measures

Anger was measured with 5 items from the Multidimensional Anger Inventory. A sample item is "I tend to get angry more frequently than most people".

Coping was measured with 8 items from the Generalized Self-Efficacy Scale, A sample item is "How well do you cope with stress in your daily life?".

Depression was measured with 7 items from the Center for Epidemiological Studies Depression Scale. A sample item is "I felt that I could not shake of the blues even with the help from my family or friends".

Financial stress was measured with 4 items from the AF CA/POLARIS Survey. A sample item includes "How much difficulty do you have living on your total household income right now?".

Insomnia was measured with 3 items from the NIH PROMIS Sleep Disturbance Scale. A sample item is "I had a problem with my sleep".

Intimate relationship satisfaction was measured with 16 items from the Couple Satisfaction Index (CSI). A sample item is "I have a warm and comfortable relationship with my partner".

Parenting satisfaction was measured with 3 items from the Relationship Satisfaction Scale. A sample item is "All things considered, how satisfied are you with your relationship with your child/ren?".

PTSD was measured with 17 items from the PTSD Checklist, focused on the presence or absence of post-traumatic stress disorder symptoms.

Resiliency was measured with 10 items from the Conner-Davidson Resilience Scale. A sample item is "How things go in my life depends on my own actions".

Process Measures

In addition, various informants completed measures of NORTH STAR intervention processes. At Times 2 and 3, participants additionally completed measures of exposure to intervention activities. Squadron commanders and their designees as well as NORTH STAR Guides also completed measures of the climate for preventive intervention at Time 1 and intervention activities at all three time points. The variables drawn from these assessments for outcome analyses are listed by type and informant in Appendix C Table 2.

Intervention

The NORTH STAR Prevention System comprises four components, all focused within a squadron, including (1) the anonymous surveying of unit members on targeted problems they may be facing – namely alcohol misuse, suicidality, and partner maltreatment – as well as their levels of risk and protective factors that are related to those problems and that are often present before such problems manifest themselves; (2) providing commanders with a dashboard of survey results; (3) a NORTH STAR Guide sharing the results with commanders and other unit leaders and then supporting squadron commanders in developing an action plan based on results that includes anonymous access to "light touch" interventions that have been demonstrated, through research, to decrease risk and strengthen protection; and (4) a NORTH STAR Guide supporting commanders and other unit leaders in their implementation of their action plan. Each time a survey was conducted, the other three components were also conducted.

Intervention Outcomes

Methods

The design and analyses meld several recommended strategies in community intervention trials (e.g., Atienza & King, 2002; Murray et al., 2004). Prevention scientists have frequently advocated for repeated cross-sectional and/or longitudinal cohort designs. The repeated cross-sectional (RCS) design samples each community two or more times (repeated), but separate groups of people each time (cross-sectional). In contrast, the longitudinal cohort (LC) design repeatedly samples the same set of

individuals nested within communities. Some have argued in favor of the repeated cross-sectional design because of its match with the goal of community-based interventions: to change health at the community level (e.g., Koepsell et al., 1995). On the other hand, scientists have also noted that RCS designs generally have lower power than LC designs, as sampling error accrues because of different individuals being sampled each time the community is measured (e.g., Diehr et al., 1995). Moreover, RCS designs suffer from increasing "in-migration" of individuals into study communities over time, with such individuals not receiving the full intervention. "Out-migration" is a problem for both designs, because of the risk of contamination between conditions if individuals from intervention communities join and influence the health of members of control communities. Attrition, however, represents a special threat to LC designs because of decreased power and potential biasing of results (e.g., if the least healthy individuals have higher drop-out rates). We utilized a dual RCS-LC design that capitalizes on each design's strengths and compensates for their weaknesses.

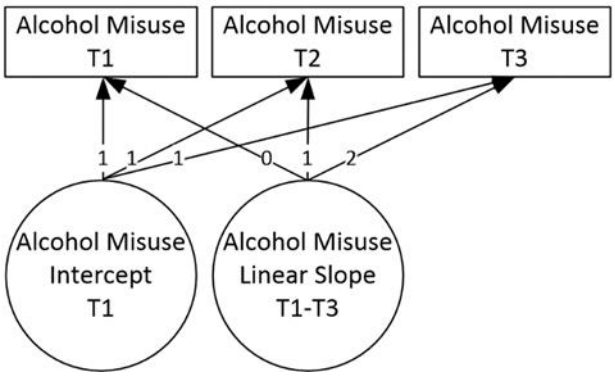
Primary outcome analyses were conducted using Mplus structural equation modeling software (Muthén & Muthén, 1998-2017). Clustering due to squadron membership (i.e., similarities among people within a squadron) was handled via robust pseudo maximum likelihood estimation method (RPML; type = complex, in the Mplus analysis specifications), which utilizes a sandwich estimator to adjust parameters' standard errors for the non-independence of clustered observations (Asparouhov & Muthén, 2005). RPML allowed for all available cases to be used for each analysis, even those with missing data. Compared to the listwise deletion of cases with missing data, this method of missing data handling produces less biased estimates of statistical parameters (Schafer & Graham, 2002). All analyses were conducted following the intent to treat principle: all participants were included in the group to which they were assigned, irrespective of their own or their unit's participation in intervention activities.

Longitudinal Cohort Analyses

Intervention Effects for Individuals

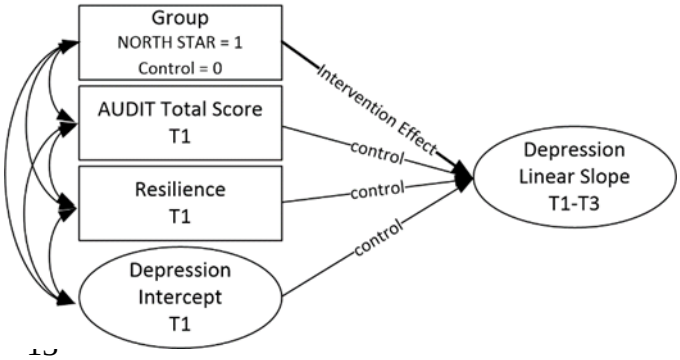
Growth curve approach. Change in secretive problems (alcohol misuse, suicidality, and partner maltreatment) and risk and protective factors (RPFs; depressive symptoms, PTSD symptoms, anger, insomnia, coping, resilience, financial stress, intimate partner relationship satisfaction, and parenting satisfaction) were modeled at the level of the individual person (Level 1) using latent growth curve (LGC) models (Duncan, Duncan, & Strycker, 2006). The LGC approach is illustrated for alcohol misuse in Figure 1. Latent variables are estimated that reflect the person's alcohol misuse at T1 (i.e., the intercept) and rate and direction of change in alcohol misuse over all three waves of assessment (i.e., linear slope). The slope loadings (0, 1, and 2) and intercept loadings (1, 1, and 1) specify linear change, beginning at the T1 wave of assessment. LGC models are general and could accommodate our dichotomous variables (e.g., the presence/absence of each secretive problem), continuous variables (e.g., scores on RPFs), and count variable (the number of secretive problems endorsed).

Figure 1. Latent Growth Curve Operationalization of Change



Main effects of intervention. The latent slope factors become the dependent variables

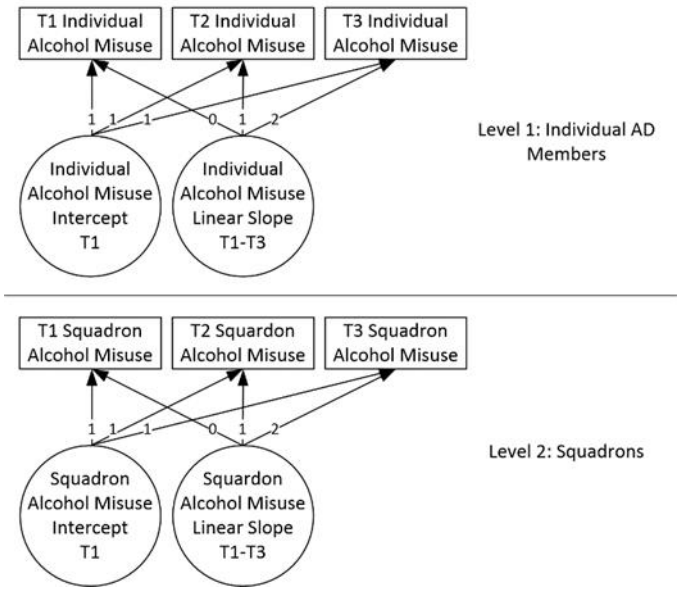
Figure 2. Intervention Effects Model



(DV) for examining treatment effects. DVs' slopes were regressed on group (coded 1 for NORTH STAR and 0 for Control), as well as two covariates measured at T1 that were found to differ between the two groups (AUDIT total scores and resilience) and the intercept for the DV. The inclusion of these three covariates allowed us to control for preexisting differences between the groups as well as regression to the mean in each DV (i.e., the tendency of very high or very low scores to return to a more moderate level over time). Covariances were allowed among all independent variables (IVs). The model is illustrated in Figure 2 using depressive symptoms as the DV. The path from group to the depression slope is the test of the intervention effect, statistically evaluated against zero. One such model was evaluated for each secretive problem and RPF. Models for partner maltreatment and intimate relationship satisfaction were limited to individuals who were married or cohabiting with a partner. Parenting satisfaction models were limited to individuals with children. As reported in Appendix C Table 3, change in secretive problems and RPFs did not significantly depend on group assignment; intervention main effects were nonsignificant.

Moderated intervention effects. We next examined whether intervention effects were moderated by three squadron intervention climate variables measured by squadron commanders and their designees at T1: positive attitude toward empirical prevention, barriers to implementation, and unit/leadership support for prevention. These variables, as well as related interaction terms were added to each of the main effects models described above. In each case, we regressed the linear slope of a DV on group, the two covariates, the DV's intercept, a moderator, and a multiplicative group-moderator interaction term. For example, to examine the moderating influence of barriers to implementation on the effect of NORTH STAR on PTSD symptoms, we regressed the linear slope of PTSD on group, AUDIT total score, resilience, the PTSD intercept, barriers to implementation, and Group × Barriers to Implementation. The coefficient for the interaction term was evaluated against zero. Significant interaction effects were probed by calculating simple slopes at +/- 1 SDs on the moderator (Preacher, Curran, & Bauer, 2006).

Figure 3. Multilevel Latent Growth Curve Operationalization of Change



Five interactions were significant for RPFs (Appendix C Table 4): the Group × Positive Attitude Toward Empirical Prevention interaction in relation to change in anger and insomnia, the Group × Barriers to Implementation interaction in relation to parenting satisfaction, and the Group × Unit/Leadership Support for Prevention interaction in relation to insomnia and coping. The simple slopes corresponding to each significant interaction are presented in Appendix C Table 5, none of which were significant. In other words, the effect of NORTH STAR on anger, insomnia, coping, and parenting satisfaction depended in some cases on commanders' and their designees' attitudes toward empirical prevention and perceptions of barriers to implementation and unit/leadership support for prevention. However, the differences were small. The effect of NORTH STAR, compared to the control group, in change in anger, insomnia, coping, and parenting satisfaction sometimes reversed direction at high vs. low levels of a moderator. Yet, when its effects were isolated at specific high and low levels of each moderator, those effects were nonsignificant. An example is the Group × Barriers to Implementation interaction in relation to change in parenting satisfaction. At low levels of barriers to implementation, NORTH STAR participants had smaller nonsignificant decreases in parenting satisfaction than did

Control participants. At high levels of barriers to implementation, NORTH STAR participants exhibited superior increases in parenting satisfaction.

Intervention Effects for Squadrons

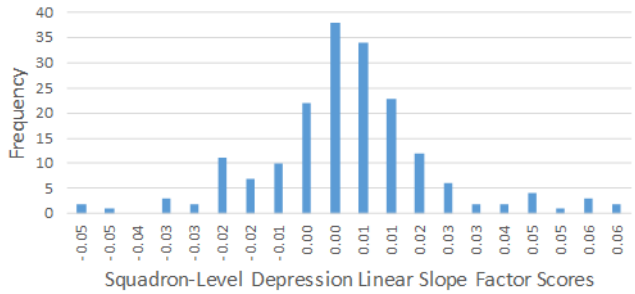
The next set of analyses focused on whether squadrons assigned to NORTH STAR, compared to control squadrons, collectively exhibited superior improvements in secretive problems and RPFs. Multilevel LGCs were estimated that operationalized T1 intercepts and T1-T3 linear change at Level 1 (individuals) and Level 2 (squadrons) simultaneously. However, our focus was on Level 2, given our interest in modeling intervention effects for squadrons. The model is exemplified for alcohol misuse in Figure 3. The Level 1 model is the same that of Figure 1. Conceptually, the Level 2 model can be understood as reflecting the T1 rate of alcohol misuse in each squadron (i.e., intercept) and linear change in the rate of alcohol misuse in each squadron from T1-T3 (i.e., slope).

Typically, there is less variation in change for a group of people than for individuals. For example, in an annual national epidemiological survey, the incidence of depression for the US is likely to change only slightly from year to year. However, many individuals in the US population will experience significant year to year change in depression; some people become depressed while others may experience remission. The lesser variation in how groups vs. people change over time often poses a statistical hurdle: range restriction. Thus, prior to examining intervention effects on squadron-level change in secretive problems and RPFs, we statistically evaluated the Level 2 variance terms against zero to assess for range restriction. Statistically significant variance terms would indicate that there was sufficient variation in squadron-level growth to allow for the evaluation of intervention effects. Unfortunately, none of the Level 2 slope variance estimates were significant (Appendix C Table 6). Range restriction was problematic. The problem is exemplified by examining the histogram of squadron-level slope factor scores of depressive symptoms. These factor scores represent the average direction and amount of change in a squadron's depressive symptoms per cycle (i.e., interval between waves of assessment). As can be seen in Figure 4, the maximum increase of a squadron's depressive symptoms was approximately .06 points per cycle; the minimum decrease was about -.05 points per cycle. This degree of change is very small when judged relative to the amount of change exhibited by individuals. Level 1 slope factor scores ranged from -.29 to .30; variation that was statistically significant (variance = 0.017, $p = 0.020$). In sum, squadrons' secretive problems and RPFs changed similarly over time. Given this range restriction, we could not evaluate intervention effects at this level.

Repeated Cross-Sectional Analyses

Main effects of intervention. We conducted multilevel analyses with intervention effects estimated at Level-1 (i.e., person). As a defining characteristic of repeated cross-sectional analyses, all variables, including time, were treated as between-subjects variables. Each outcome was simultaneously regressed on group (1 = NORTH STAR; 0 = Control), time (T3 = 1 vs. T1 = 0), Group × Time, and the two T1 covariates used above (AUDIT total scores and resilience). The Time × Group term (i.e., Does change in secretive problems and RPFs from T1 to T3 depend on group?) reflects the main effects of NORTH STAR, adjusted for covariates. As in the longitudinal cohort analyses clustering due to squadron membership was handled via robust pseudo maximum likelihood estimation method. To satisfy the independence assumption of repeated cross-sectional analysis, participants who

Figure 4. Histogram of Squadron-Level T1-T3 Slopes for Depression



participated in more than one wave of assessment had one wave of data randomly selected for inclusion in these analyses. Per the Appendix C Table 7 results, none of the main effects were statistically significant.

Moderated intervention effects. We next examined whether intervention effects were moderated by three squadron intervention climate variables measured by squadron commanders and their designees at T1: positive attitude toward empirical prevention, barriers to implementation, and unit/leadership support for prevention. These variables, as well as related interaction terms were added to each of the main effects models described above. Each DV was simultaneously regressed on the two T1 covariates used above (AUDIT total scores and resilience), group (1 = NORTH STAR; 0 = Control), time (T3 = 1 vs. T1 = 0), a moderator, and Group × Time, Group × Moderator, Time × Moderator, and Group × Time × Moderator interaction terms. The comparison against zero of the coefficient for the 3-way interaction is the test of the moderated treatment effect. It addresses the question of whether the intervention effect (i.e., the Group × Time interaction) itself depends on the moderator. Significant interaction effects were probed by calculating simple slopes at +/- 1 SDs on the moderator (Preacher, Curran, & Bauer, 2006).

Two interactions were significant for RPFs (Appendix C Table 8): the Group × Time × Positive Attitude Toward Empirical Prevention interaction in relation to Depression, and the Group × Time × Unit/Leadership Support for Prevention interaction in relation to resilience. Simple slope analyses of these two significant interactions are presented in Appendix C Table 9. At low levels of positive attitudes toward empirical prevention, NORTH STAR participants exhibited significant increases in depressive symptoms, whereas Control participants exhibited nonsignificant decreases. Significant increases in NORTH STAR versus nonsignificant decreases in Control participants were also found at high levels of positive attitudes toward empirical prevention, although the simple slopes were of smaller magnitude. A similar, although weaker, pattern was found for resilience in relation to unit/leadership support for prevention. However, none of the simple slopes were significant.

Subgroup Analyses

Main effects were separately analyzed for the $N = 652$ individuals who had returned from an OIF/OEF/OND deployment within the last 6 months. The analytic models were identical to the main effects models for the full sample. Per the results presented in Appendix C Table 10, increases in coping were greater for participants in the NORTH STAR group, compared to those in the control group.

Intervention Processes

Methods

The relation between intervention processes and outcomes were examined through a variety of statistical procedures, including bivariate correlations, linear regressions, and paired *t*-tests.

Unit Member Social Processes

The degree to which social processes amongst the members of a unit were related to intervention dissemination and uptake was examined first. At the T2 and T3 assessments, survey participants were asked about their exposure to and use of EBIs. For each EBI, participants rated the extent to which each EBI was promoted in their unit, from 1=”Not at all” to 5=”Very much”, as well as whether they had personally used the EBI and whether their friends had used it. These ratings were summed across all EBIs at each time to create scores that represented total EBI promotion in their squadron, total self-use, and total use by friends. Descriptive statistics for these variables are presented in Appendix C Table 11. We note that each of these variables increased from Time 2 to Time 3. We next examined social

processes linking participants' awareness of squadron-level EBI dissemination efforts to use of EBIs by the self and friends (see Appendix C Table 12). At both T2 and T3, awareness of EBI promotion was positively associated with self and friend use of EBIs. Speaking to potential social network effects, participants whose friends' EBI use was greater reported greater self-use of EBIs. Unfortunately, we were unable to do additional proposed analyses related to social networks because we were not approved by the AF Survey Office to collect the data needed for such analyses.

Leadership Processes

Three hypotheses were then examined regarding a variety of other potentially relevant unit processes to outcomes, and results are provided below.

Hypothesis 1. Process variables will improve over time as NORTH STAR becomes more ingrained within a unit. To test for differences in process factors from T1 to T2, T2 to T3, and T1 to T3, we conducted a series of paired samples *t*-tests comparing T1 to T2, T2 to T3, and T1 to T3 for each variable collected. Not all variables were collected at every time point; if a time comparison is missing, it is because we did not collect that data at one of the associated assessments. Of the 39 comparisons examined, 8 were statistically significantly with a *p*-value of < .05 and no corrections applied for multiple comparisons (see Appendix C Table 13). For ease of reading, all significant effects are bolded. Commanders scheduled more check-in dates with their Airmen at T3 than they did at T1 or T2. Commanders also selected more targeted risk and protective factors and evidence-based interventions at T3 than they did at T1. Further, commanders indicated that their units would gain more benefits from NORTH STAR at T3 than they did at T2. Commanders reported more satisfaction with their units' NORTH STAR survey participation rates at T3 than at T2. With only one exception, all significant differences were in the expected direction with better reported process functioning at later time points than at earlier time points.

Hypothesis 2. Process variables will improve more for units with embedded mental health support staff than for those without such support. To test this hypothesis, we repeated the analyses described above after splitting the sample by units that had embedded mental health support staff compared to units without embedded support staff. Squadrons without embedded providers had more significant changes across time in process factors (7 versus 5). However, the direction of effects was not consistent for squadrons without embedded providers.

For squadrons with embedded providers, significant effects were always in the direction of improved process over time. Significant results are discussed below; statistical details are provided in Appendix C Tables 14 and 15. For ease of reading, all significant effects are bolded. For squadrons without embedded providers, a number of constructs showed significant change across time. The number of planned check-ins increased from T1 to T3 and from T2 to T3. Commanders' reported satisfaction with their survey participation rates increased from T2 to T3. Interestingly, however, commander engagement rated by NORTH STAR Guides decreased from T2 to T3. Further, NORTH STAR Guide ratings of how likely commanders would be to implement their action plans decreased from T1 to T3. NORTH STAR Guide reports of how easy it was to schedule briefings with commanders increased from T1 to T2, but decreased from T2 to T3.

For squadrons with embedded providers, a variety of constructs also showed significant change. Commanders scheduled significantly more check-ins from T2 to T3. Commanders reported fewer anticipated barriers to implementation from T2 to T3. Commanders reported increased Airmen receptivity to action plans from T2 to T3. Finally, NORTH STAR Guides reported improved ease in scheduling briefings from T1 to T2 and from T1 to T3. Thus, in all cases, significant effects for squadrons with embedded providers demonstrated improvement over time. In contrast, changes in squadrons without embedded providers were mixed with some constructs demonstrating improvement and others demonstrating decline.

Hypothesis 3. Process variables will be associated with change in secretive problems from T1-T3. We first created change scores in rates of alcohol misuse, partner maltreatment, and suicidality from T1 to T3 (positive = increase; negative = decrease) and calculated bivariate correlations between those scores and all continuous process factors. Negative correlations indicate that higher levels of these process factors are associated with decreased rates of that secretive problem from T1-T3. For dichotomous process factors, we examined mean differences in the change scores for each secretive problem. Lastly, we ran regression analyses predicting rates of alcohol misuse, partner maltreatment, and suicidality at T3 from each of the process factors, controlling for the corresponding secretive problem rate at T1. Few (13 of 129) bivariate correlations between secretive problem change scores and process factors were significant (see Appendix C Table 15). Across all correlations (significant and non-significant) 38% of the associations were negative. Of the significant correlations, 50% were negative. If we look solely at time ordered effects (i.e., removing T3 process factor associations), across all correlations (significant and non-significant) 45% were negative. Considering only significant correlations, 83% were negative. Thus, results were more likely to be in the expected direction – better process factors are associated with decreases in secretive problems – if we only consider process factors assessed prior to the final assessment of secretive problems at T3.

We then examined mean differences in change in secretive problems from T1 to T3 by dichotomous process factors (see Appendix C Tables 17 through 19). Only two means were significantly different from each other based on presence or absence of measured process factors. For commanders who reported adapting their action plan at T3, there were decreased rates of partner maltreatment from T1 to T3 (average decrease of 1.6%); in contrast, commanders who reported no adaptations had increased rates of partner maltreatment in their squadrons (average increase of 1.7%). In contrast, commanders who reported using activities other than NORTH STAR to address secretive problems in their squadrons had increased rates of suicidality from T1-T3 (mean increase of 1.8%), whereas those who did not report such activities had approximately even rates of suicidality from T1-T3 (mean decrease of 0.4%).

By and large, alcohol misuse at T1, predicted alcohol misuse at T3 (in 45 of 64 models = 70%; see Appendix C Table 20). Only two process factors significantly predicted alcohol misuse at T3 after controlling for alcohol misuse at T1. Squadrons whose commanders scheduled more NORTH STAR check-in dates at T2 had higher rates of alcohol misuse at T3. Further, longer briefings at T3 were associated with higher rates of alcohol misuse at T3. In contrast, partner maltreatment at T1 did not significantly predict partner maltreatment at T3 in any tested models. Only three process factors significantly predicted rates of partner maltreatment at T3 after controlling for rates of partner maltreatment at T1, and two of those three significant predictors were contemporaneous, making the direction of effects unclear (see Appendix C Table 21). Namely, more barriers to action plan implementation reported by commanders at T2 predicted lower rates of partner maltreatment at T3; commanders who planned to use more airmen engagement strategies at T3 had higher rates of partner maltreatment in their squadrons at T3; and longer NORTH STAR briefings at T3 were associated with higher rates of partner maltreatment at T3. Finally, in approximately 2/3 of the tested models, suicidality at T1 predicted suicidality at T3 (41 of 64 models = 64%). There were 4 process factors that significantly predicted rates of suicidality at T3 after controlling for rates of suicidality at T1 (see Appendix C Table 22): Squadrons whose commanders scheduled more NORTH STAR check-in dates at T1 had lower rates of suicidality at T3; commanders who reported more positive expectancies from NORTH STAR at T1 had lower rates of suicidality in their squadrons at T3; squadrons whose commanders reported that their Airmen had good reactions to the NORTH STAR action plan at T2 had lower rates of suicidality at T3; and commanders who reported more positive expectancies from NORTH STAR at T3 had lower rates of suicidality in their squadrons at T3.

Supplementary Research

While conducting work during Phase 3, we continued to receive inquiries from interested squadrons outside of the Task Force True North. We did not have the capacity to respond to most of these requests, but after consultation with our project officer and our AF POCs, but we did respond to requests that would provide information about NORTH STAR that was not present in the squadrons we were recruiting. The major area that we ended up focusing on in this regard was the Air National Guard. We had multiple requests from Guard units to participate, but only one set of requests where there was follow through from the requestor -- from an entire wing. The base where this wing was stationed was close in proximity to the home residence of one of the project scientists. After multiple visits to the base and meetings with base leadership and the local IDS, a hybrid version of NORTH STAR, including elements of the NORTH STAR from the first trial (i.e., NORTH STAR in bases) and of the current version of NORTH STAR (i.e., NORTH STAR in units) was employed. As during Phase 3 of the broader project, the longer NORTH STAR was employed on the base and in squadrons, the greater uptake. For example, three times as many Airmen completed the second NORTH STAR Survey than the first, and engagement of command at all levels of the base increased during those two time-points. Probably the biggest change on the base related to NORTH STAR was the base leadership using NORTH STAR Survey data to advocate for additional providers on the base. Prior to NORTH STAR, there was one Director of Psychological Health (DPH) and no chaplain. After NORTH STAR, there are two DPHs and one full time chaplain. This puts the base in a better position to address both intervention and prevention concerns around secretive problems. As news spread, other Guard units in the region took notice of this, and inquiries for NORTH STAR increased near the end of the project. Unfortunately, we were not in a position to respond at that time, but clearly there is interest in the Guard not only for data on problems but for evidence-guided approaches like NORTH STAR.

What opportunities for training and professional development has the project provided?

Training and professional development were not formal aims for this research project. Yet, in its execution, our team's expertise in (a) consulting with commanders on the secretive problems of the Airmen in their squadrons and potential evidence-based preventive interventions to address these problems, (b) consulting with support personnel on AF bases on secretive problems and potential interventions, and (c) consulting with AF leaders on secretive problems and potential interventions have all deepened enormously. We learned much about how to do this work well both within AD and National Guard settings. This strengthening of expertise was both conceptual and pragmatic and will doubtlessly enrich our ongoing and future research with the AF.

How were the results disseminated to communities of interest?

The results of the present research were presented at annual MOMRP and AF research meetings (see "Products" section below). In the future, we will present our findings related to the aims at appropriate civilian research meetings, integrated into our ongoing program of community based research activities with the AF. We will also publish papers based on the work described in this report.

4. IMPACT

What was the impact on the development of the principal discipline(s) of the project?

The present research is inherently interdisciplinary, thus a principal discipline is difficult to identify. Within psychology, it touches on clinical, developmental, family, social, and community arms of the discipline. It also incorporates elements of epidemiology, public health, and prevention science. Accordingly, findings based on our research have the potential to impact each of these disciplines and their subdisciplines. This work demonstrates the power of an integrated approach to answer questions important to the health of individuals and communities.

What was the impact on other disciplines?

See immediately preceding impact statement.

What was the impact on technology transfer?

Nothing to report.

What was the impact on society beyond science and technology?

NORTH STAR is a version of community-based efforts that are commonly used in a wide variety of settings, such as within school communities, or within towns or cities. These efforts are often quite challenging, presumably because of lack of control -- i.e., an open system -- and a lack of a hierarchical leadership structure. In this study, work was taking place within a relatively closed system with a hierarchical leadership structure, yet despite those potentially positive characteristics, preventive efforts were still extremely challenging. A key finding that emerged, however, was that the longer the effort continued, the more people "got on board" and engaged with the various aspects of the prevention system. Further, as embedded providers came into units and provided direct, tangible supports around the prevention system to commanders, the easier it became to engage commanders and leadership and Airmen. In other words, even relatively low key prevention systems like NORTH STAR require resources and time to be effective and that is true even when working within more closed systems with hierarchical leadership.

Given that prevention is often the last thing that happens within community settings because there never is enough time and resources to adequately provide intervention services for problems, let alone services for problems that haven't happened yet, finding systems that are low cost yet effective is extremely important for public health. The light touch, evidence-based preventive interventions that were disseminated in NORTH STAR hold promise, but this trial points out the need for finding ways for more efficiently getting them into the hands of people that need them. NORTH STAR provided a way to do that, but without a vetting system such as the one that was used here to identify such interventions, and without a distribution system to inform people about them, it is hard as a consumer to get connected and find the "best" such interventions. Further, this study highlights the need for these interventions to engage not only potential users, but key people who interact with and care about those potential users, in this case military commanders, other unit leadership, mental health providers, and chaplains. Such as finding is relevant to non-military communities as well.

5. CHANGES/PROBLEMS

Changes in approach and reasons for change

Changes in approach were required due to a lengthy delay in receiving required approvals to proceed with the work, and changes in prevention approaches within the AF that were occurring during this period of time.

Actual or anticipated problems or delays and actions or plans to resolve them

The 5-year grant that funded this project was awarded in September 2011. We received institutional review board (IRB) approval for the research from NYU in May 2011, and then submitted the approval to the Human Research Protection Office (HRPO) for review. HRPO asked for revisions, and the NYU IRB approved these revisions in March 2012. We obtained HRPO approval in June 2012. HRPO worked with the Air Force Surgeon General in this approval. At this point, we were ready to proceed with study recruitment and randomization, but unfortunately, when then experienced an extended delay in receiving approval from the Air Force Survey Office. After multiple rounds of revision, including the requested deletion of various constructs from the NORTH STAR Survey (e.g., child abuse, drug use), we were finally given a survey control number. However, this was then followed by a new set of multiple rounds of revisions to the recruitment materials, as requested by various other AF personnel. When this process was completed, the full package of materials was routed to the AF Associate Vice Chief of Staff (CVA) for final review and approval. Additional requests for revisions were made and completed, and in July 2015, the CVA signed the letter needed to initiate recruitment of squadrons for the study.

With this letter in hand, by October 2015, the first squadrons were recruited and data collection was initiated. By January 2016, 15 squadrons had been recruited. During 2017, the AF was considering trying a broader, multimodal approach to prevention, and leaders in the Integrated Resilience Office in the Pentagon expressed interest in including NORTH STAR as part of that approach. At this point, we were in the fifth year of the funding yet had only had a brief period time to actually conduct the project. Given the promise presented by this new approach, we requested and were granted an unfunded continuation year. During 2017, NORTH STAR was formally wrapped into this the Task Force True North initiative under the Office of the Vice Chief of the Air Force. The "beta-test" for this prevention approach was to be conducted with a total of 7 installations, including two joint bases. Once we were part of this initiative, recruitment of squadrons into the NORTH STAR trial took off, and the first assessment with this new set of squadrons began in November 2017. Two additional requests were made and approved to continue the project. In the end, this project lasted 8 years.

Changes that had a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

See "Actual or anticipated problems or delays and actions or plans to resolve them" section above related to changes in the use of human subjects.

6. PRODUCTS

Publications, conference papers, and presentations

Manuscripts Submitted for Publication

Slep, A. M. S., Heyman, R. E., Lorber, M. F., Baucom, K. J. W., & Linkh, D. J. (2019). *Evaluating the Effectiveness of NORTH STAR: A Community-Based Framework to Reduce Secretive Adult Problems*. Manuscript submitted for publication

Manuscripts in Preparation

Slep, A. M. S., Heyman, R., Rhoades, K. A., Lorber, M. F., & Eddy, J. M. (in preparation). *Predictors of Implementation of the NORTH STAR 2 Prevention System within Squadrons in the US Air Force.*

Slep, A. M. S., Heyman, R., Lorber, M. F., Tiberio, S., & Eddy, J. M. (in preparation). *Outcomes from a Trial of NORTH STAR 2: A Squadron-focused Community-Based Framework to Reduce Secretive Adult Problems*.

Slep, A. M. S., Heyman, R., & Eddy, J. M. (in preparation). *Lessons for Preventive Efforts within the US Air Force Learned in the Implementation of the NORTH STAR 2 Community-Based Trial*.

Presentations

Rhoades, K. A., Lorber, M., Eddy, J. M., Slep, A. M., & Heyman, R. E. (May, 2019). *NORTH STAR Prevention System in the US Air Force: Predictors of implementation*. Paper presented at the annual meeting of the Society for Prevention Research, San Francisco, CA.

Slep, A. M., Heyman, R. E., Lorber, M. F., & Eddy, J. M. (August, 2018). *NORTH STAR: Light-touch, multi-pronged intervention*. Paper presented at the annual meeting of the Military Health System Research Symposium, Kissimmee, FL.

Heyman, R. E. & Slep, A. M. S. (2013, September). *Improving the Behavioral Health of Military Communities: Two University-AF Partnerships (NORTH STAR & ARMOR) for Translating Evidence-Based Interventions into Community Action*. Invited presentation at the Forum on Military Families in Transition: Stress, Resilience, and Well-Being Walter Reed Army Institute of Research, Silver Spring, MD.

Website(s) or other Internet site(s)

Nothing to report.

Technologies or techniques

Nothing to report.

Inventions, patent applications, and/or licenses

Nothing to report.

Other products

None.

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project? (since last reporting period)

Name:	*Richard Heyman*
Project Role:	*Principal Investigator*
Researcher Identifier (e.g. ORCID ID):	eRA Commons - rheyman
Nearest person month worked:	*0.7*
Contribution to Project:	*Dr. Heyman has overseen all aspects of the conduct of the project, including data collection, management, processing, and analysis. He oversaw ongoing communication with funder and program officer, and briefed funding agents about progress, challenges, and findings at regularly scheduled twice annual AF briefings.*
Funding Support:	National Institute of Dental & Craniofacial Research (NIDCR) US Department of Agriculture (USDA) Department of Justice (DOJ) Army Medical Research and Material Command (AMRMC)

Name:	*Amy Slep*
Project Role:	*Principal Investigator*
Researcher Identifier (e.g. ORCID ID):	eRA Commons - amyslep
Nearest person month worked:	*0.5*
Contribution to Project:	*Dr. Slep has overseen all aspects of the conduct of the project, including data collection, management, processing, and analysis. She oversaw ongoing communication with funder and program officer, and briefed funding agents about progress, challenges, and findings at regularly scheduled twice annual AF briefings.*
Funding Support:	NIDCR USDA DOJ AMRMC Institute Education Sciences (IES)

Name:	*Michael Lorber*
Project Role:	*Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person	*3.4*

month worked:	
Contribution to Project:	*Dr. Lorber has overseen data analyses, including design of data analysis plans, execution of analysis, and report and manuscript preparation.*
Funding Support:	NIDCR USDA DOJ IES AMRMC U.S. Department of Housing and Urban Development (HUD) Oregon Criminal Justice Commission (CJC)

Name:	*Stacey Tiberio*
Project Role:	*Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	0.9
Contribution to Project:	*Dr. Tiberio served as a quantitative methodologist on the project.*
Funding Support:	DOJ HUD USDA AMRMC

Name:	*Justin Chase*
Project Role:	*Junior Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	1.6
Contribution to Project:	*Mr. Chase served as a web programmer and data analyst and assisted in the preparation of various reports.*
Funding Support:	USDA

Name:	*J. Mark Eddy*
Project Role:	*Project Coordinator*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	*3.0*
Contribution to Project:	*Dr. Eddy served as project coordinator, coordinating with USAF leadership and commanders, managing a wide variety of interactions with USAF personnel, coordinating NORTH STAR Guides (presented results to commanders and support the development and implementation of prevention plans for squadrons) and the day to day aspects of the*

	project for other staff members which revolved around Guide activities. He also served as as a NORTH STAR Guide.
Funding Support:	NIDCR USDA DOJ IES HUD CJC Administration for Children and Families (ACF)

Name:	*Sara Nichols*
Project Role:	*Clinician*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	*3.5*
Contribution to Project:	*Dr. Nichols served as a NORTH STAR Guide for commanders.*
Funding Support:	USDA

Name:	*Kimberly Rhoades*
Project Role:	*Clinician*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	*5.4*
Contribution to Project:	*Dr. Rhoades served as a NORTH STAR Guide for commanders.*
Funding Support:	USDA NIDCR

Name:	*Ann Erlanger*
Project Role:	*Clinician*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	1.2
Contribution to Project:	*Dr. Erlanger served as a NORTH STAR Guide for commanders.*
Funding Support:	USDA

Name:	*Roland Hart*

Project Role:	*Junior Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	4.0
Contribution to Project:	*Mr. Hart assisted Dr. Eddy in managing various vital day to day aspects of the project, such as scheduling commanders, tracking information, ensuring that basic tasks were done to meet key deadlines, etc.*
Funding Support:	USDA

Name:	*Kathleen Cracknell*
Project Role:	*Junior Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	*6.4*
Contribution to Project:	*Ms. Cracknell served as data manager and analyst.*
Funding Support:	USDA

Name:	*Jessica Harlow*
Project Role:	*Junior Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	4.8
Contribution to Project:	*Ms. Harlow supported the execution of the various aspects of the project, performing tasks such as literature searches; data collection, entry and cleaning; and assisting with the preparation of reports.*
Funding Support:	USDA

Name:	*Ashley Dills*
Project Role:	*Junior Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	1.3
Contribution to Project:	*Ms. Dills supported the execution of the various aspects of the project, performing tasks such as literature searches; data collection, entry and cleaning; and assisting with the preparation of reports.*

Funding Support:	USDA NIDCR

Name:	*Angela Marinakis*
Project Role:	*Junior Research Scientist*
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	1.4
Contribution to Project:	*Ms. Marinakis supported the execution of the various aspects of the project, performing tasks such as literature searches; data collection, entry and cleaning; and assisting with the preparation of reports.*
Funding Support:	DOJ USDA NIDCR IES AMRMC

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Nothing to report.

What other organizations were involved as partners?

Nothing to report.

8. SPECIAL REPORTING REQUIREMENTS

The quad chart was uploaded as an attachment: file name "NORTH STAR Quad Chart.pdf".

9. APPENDICES

Appendices A-E begin on the following page.

Appendix A

Abbreviations and Acronyms

AD	Active duty
AF or USAF	United States Air Force
AFMOA	Air Force Medical Operations Agency
AUDIT	Alcohol Use Disorders Identification Test
B	Standardized Beta
CVA	Associate Vice Chief of Staff
df	Degrees of freedom
DPH	Director of Psychological Health
DUI	Driving under the influence
DV	Dependent variable
EBI	Evidence-based intervention
F	F-test
HAF	Air Force headquarters
HRPO	Human Research Protection Office
IDS	Integrated Delivery System
IRB	Institutional Review Board
IV	Independent variable
LC	Longitudinal cohort
LGC	Longitudinal growth curves
M	Mean
MAJCOM	Major command
MOMRP	Military Operational Medicine Research Program
MOU	Memorandum of understanding
N or n	Number of participants
NIH	National Institutes of Health
NORTH STAR	New Orientation to Reduce Threats to Health from Secretive problems That Affect Readiness
NYU	New York University
p	Probability value
POC	Point of contact
PDF	Portable document format
PTSD	Post-traumatic stress disorder
RCS	Repeated cross-sectional
RCT	Randomized controlled trial
RPFs	Risk and protective factors
RPML	Robust pseudo maximum likelihood
SD	Standard deviation
t	t-test
T1	Time 1 (baseline or initial assessment or wave 1)
T2	Time 2 (6-month assessment or wave 2)
T3	Time 3 (12-month assessment or wave 3)

Appendix B

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Appendix C

Intervention outcome and process analysis tables are provided on the following pages.

Table 1. *Sample Characteristics*

Variable	Time 1	Time 2	Time 3
Number of participants	10,391	6,197	10,612
Group			
NORTH STAR	51.4%	56.9%	50.2%
Control	48.6%	43.1%	49.8%
Installation			
Base 1	9.3%	5.4%	7.3%
Base 2	10.0%	2.9%	12.3%
Base 3	19.7%	30.9%	26.3%
Base 4	13.3%	17.2%	22.1%
Base 5	10.7%	9.8%	6.4%
Base 6	14.5%	13.2%	9.0%
Base 7	22.4%	20.5%	16.5%
Male %	77.5%	72.9%	76.8%
Age			
17-24	29.0%	26.0%	30.7%
25-29	23.0%	22.5%	22.9%
30+	48.0%	51.5%	46.4%
Time at Squadron			
Six months or less	18.2%	14.5%	19.3%
More than six months but less than one year	12.7%	17.3%	14.1%
Greater than one year	69.1%	68.2%	66.6%
Returned from an OIF/OEF/OND deployment within the last 6 months	6.6%	5.7%	6.5%
Parent	47.9%	49.5%	45.7%
Partnered (married, engaged, or seriously involved)	73.9%	75.1%	72.1%

Table 2. *Variables in the Outcome Analyses*

	Type	Informant
Secretive Problems		
Alcohol Misuse	Present/Absent	Individual
Suicidality	Present/Absent	Individual
Partner Emotional Abuse	Present/Absent	Individual
Problem Count	Count	Individual
Risk/Protective Factors		Individual
Depressive Symptoms	Mean	Individual
PTSD Symptoms	Mean	Individual
Anger	Mean	Individual
Insomnia	Mean	Individual
Coping	Mean	Individual
Resilience	Mean	Individual
Financial Stress	Mean	Individual
Intimate Partner Relationship Satisfaction	Mean	Individual
Parenting Satisfaction	Mean	Individual
Squadron Intervention Climate		
Positive Attitude Toward Empirical Prevention	Mean	Squadron Commanders and Designees
Barriers to Implementation	Mean	Squadron Commanders and Designees
Unit/Leadership Support for Prevention	Mean	Squadron Commanders and Designees
Intervention Promotion and Uptake		
EBI Promotion in Squadron	Sum	Individual
EBI Self-use	Sum	Individual
EBI Use by Friends	Sum	Individual

Table 3. *Intervention Main Effects at the Individual Level*

Dependent Variable	*B*	*p*
Secretive Problems Slopes		
Alcohol Misuse	0.006	0.849
Suicidality	-0.148	0.117
Partner Emotional Abuse	0.036	0.594
Problem Count [a]	-0.090	0.096
Risk/Protective Factors Slopes		
Depressive Symptoms	-0.017	0.504
PTSD Symptoms	-0.006	0.835
Anger	0.004	0.892
Insomnia	0.002	0.970
Coping	0.004	0.912
Resilience	-0.005	0.905
Financial Stress	-0.008	0.90
Intimate Partner Relationship Satisfaction	-0.019	0.359
Parenting Satisfaction	0.019	0.483

Note. Standardized estimates (β); negative values indicate greater decreases in the DV in the NORTH STAR group; [a] coefficient for problem count is in raw metric as it is a count variable estimated with Poisson link.

Table 4. *Moderation of Intervention Effects at the Individual Level*

	Moderator					
	Positive Attitude Toward Empirical Prevention		Barriers to Implementation		Unit/Leadership Support for Prevention	
Dependent Variable	*B*	*p*	*B*	*p*	*B*	*p*
Secretive Problems Slopes						
Alcohol Misuse	0.253	0.347	0.049	0.755	0.202	0.720
Suicidality	0.918	0.103	-0.145	0.791	0.703	0.229
Partner Emotional Abuse	0.196	0.733	-0.522	0.324	0.099	0.849
Problem Count [a]	0.212	0.109	-0.111	0.400	0.055	0.714
Risk/Protective Factors Slopes						
Depressive Symptoms	0.262	0.135	0.101	0.526	0.101	0.670
PTSD Symptoms	0.327	0.046	0.139	0.471	0.282	0.206
Anger	**0.361**	**0.012**	-0.009	0.940	-0.007	0.976
Insomnia	**0.523**	**0.001**	-0.123	0.695	**0.447**	**0.041**
Coping	-0.178	0.681	-0.349	0.257	**0.528**	**0.014**
Resilience	-0.325	0.314	-0.142	0.470	0.323	0.209
Financial Stress	-0.075	0.858	-0.206	0.446	0.342	0.353
Intimate Partner Relationship Satisfaction	-0.041	0.825	0.170	0.078	-0.020	0.930
Parenting Satisfaction	-0.171	0.470	**0.292**	**0.035**	0.058	0.806

Note. Standardized estimates (β); negative values indicate greater decreases in the DV in the NORTH STAR group; [a] coefficient for problem count is in raw metric as it is a count variable estimated with Poisson link.

Table 5. *Simple Slopes for Significant Moderated Intervention Effects*

Dependent Variable/Moderator	Intervention Effect	
	Simple Slope	*p*
DV: Anger Slope		
Moderator: Positive Attitude Toward Empirical Prevention		
Low (-1 *SD*)	-0.022	0.134
High (+1 *SD*)	0.021	0.260
DV: Insomnia Slope		
Moderator: Positive Attitude Toward Empirical Prevention		
Low (-1 *SD*)	-0.018	0.426
High (+1 *SD*)	0.043	0.099
DV: Parenting Satisfaction Slope		
Moderator: Barriers to Implementation		
Low (-1 *SD*)	-0.030	0.200
High (+1 *SD*)	0.027	0.138
DV: Insomnia Slope		
Moderator: Unit/Leadership Support for Prevention		
Low (-1 *SD*)	-0.010	0.689
High (+1 *SD*)	0.033	0.172
DV: Coping Slope		
Moderator: Unit/Leadership Support for Prevention		
Low (-1 *SD*)	-0.018	0.092
High (+1 *SD*)	0.011	0.410

Note. Simple slopes are unstandardized estimates (*B*) of intervention effects on change in RPFs for models with significant moderation (see Table 14).

Table 6. *Level-2 Variances of Change in Secretive Problems and Risk and Protective Factors*

	Level 2 Slope Variance	*p*
Secretive Problems		
Alcohol Misuse	0.028	0.076
Suicidality	0.010	0.725
Partner Emotional Abuse	0.028	0.224
Problem Count	0.002	0.243
Risk/Protective Factor Mean		
Depressive Symptoms	-0.001	0.263
PTSD Symptoms	0.001	0.297
Anger	0.001	0.441
Insomnia	0.001	0.759
Coping	-0.001	0.191
Resilience	-0.001	0.267
Financial Stress	0.000	0.885
Intimate Partner Relationship Satisfaction	0.001	0.431
Parenting Satisfaction	0.003	0.607

Table 7. *Cross-sectional Intervention Main Effects at the Individual Level T1 vs. T3*

	Group × Time Interaction	
Dependent Variable	*β*	*P*
Secretive Problems Slopes		
Alcohol Misuse	0.087	0.499
Suicidality	0.125	0.255
Partner Emotional Abuse	-0.058	0.693
Problem Count	0.036	0.647
Risk/Protective Factors Slopes		
Depressive Symptoms	0.002	0.889
PTSD Symptoms	0.002	0.910
Anger	0.014	0.333
Insomnia	-0.001	0.973
Coping	-0.005	0.782
Resilience	0.000	0.990
Financial Stress	0.013	0.511
Intimate Partner Relationship Satisfaction	-0.021	0.208
Parenting Satisfaction	0.001	0.956

Note. Coefficients are standardized estimates (*β*); due to estimation difficulties, alcohol and resilience models were not adjusted for baseline difference in count of alcohol problems and resilience.

Table 8. *Cross-sectional Moderated Intervention Effects at the Individual Level T1 vs T3*

	Moderator					
	Positive Attitude Toward Empirical Prevention		Barriers to Implementation		Unit/Leadership Support for Prevention	
Dependent Variable	*B*	*p*	*β*	*p*	*β*	*p*
Secretive Problems						
Alcohol Misuse	-0.005	0.986	0.019	0.929	0.042	0.819
Suicidality	-0.299	0.381	0.007	0.978	-0.518	0.115
Partner Emotional Abuse	-0.781	0.051	0.102	0.767	-0.388	0.199
Problem Count	-0.380	0.122	-0.057	0.763	-0.144	0.728
Risk/Protective Factors						
Depressive Symptoms	**-0.274**	**0.011**	0.057	0.519	-0.147	0.267
PTSD Symptoms	-0.012	0.909	0.073	0.350	0.026	0.841
Anger	-0.04	0.739	0.083	0.308	-0.228	0.073
Insomnia	-0.185	0.096	-0.042	0.613	-0.083	0.537
Coping	0.250	0.073	-0.136	0.156	0.174	0.310
Resilience	0.051	0.772	-0.078	0.478	**0.344**	**0.044**
Financial Stress	-0.236	0.295	0.080	0.586	-0.011	0.957
Intimate Partner Relationship Satisfaction	0.255	0.071	0.062	0.595	0.198	0.239
Parenting Satisfaction	0.080	0.744	0.016	0.914	0.142	0.539

Note. Coefficients are standardized estimates (*β*) for Group × Time × Moderator interactions; due to estimation difficulties, alcohol and resilience models were not adjusted for baseline difference in count of alcohol problems and resilience.

Table 9. *Simple Slopes for Significant Moderated Intervention Effects*

Dependent Variable/Moderator	Intervention Effect	
	Simple Slope	*p*
DV: Depressive Symptoms		
Low (-1 *SD*) Positive Attitude Toward Empirical Prevention		
Time effect | NORTH STAR	**0.265**	**0.005**
Time effect | Control	-0.119	0.318
High (+1 *SD*) Positive Attitude Toward Empirical Prevention		
Time effect | NORTH STAR	**0.202**	**0.005**
Time effect | Control	-0.086	0.339
DV: Resilience		
Low (-1 *SD*) Unit/Leadership Support for Prevention		
Time effect | NORTH STAR	-0.301	0.096
Time effect | Control	0.229	0.196
High (+1 *SD*) Unit/Leadership Support for Prevention		
Time effect | NORTH STAR	-0.229	0.093
Time effect | Control	0.181	0.191

Note. Simple slopes are unstandardized estimates (*B*) of intervention effects on change in RPFs for models with significant moderation (see Table 8).

Table 10. *Intervention Main among Recently Deployed Individuals*

Dependent Variable	*β*	*p*
Secretive Problems		
Alcohol Misuse	-0.524	0.251
Suicidality	-0.026	0.860
Partner Emotional Abuse	-0.067	0.877
Problem Count	-0.211	0.368
Risk/Protective Factors		
Depressive Symptoms	0.096	0.250
PTSD Symptoms	0.027	0.754
Anger	0.033	0.691
Insomnia	0.147	0.310
Coping	**0.132**	**0.041**
Resilience	0.207	0.112
Financial Stress	0.096	0.250
Intimate Partner Relationship Satisfaction	-0.243	0.854
Parenting Satisfaction	0.120	0.278

Note. Standardized estimates (*β*); negative values indicate greater decreases in the DV in the NORTH STAR group.

Table 11. *Descriptive Statistics for EBI Dissemination and Uptake Variables*

Wave of Assessment/Variable	*M*	*SD*	Minimum	Maximum
Time 2				
EBI Promotion in Squadron	7.04	5.60	1.00	72.00
EBI Self-use	0.17	0.57	0.00	9.00
EBI Use by Friends	0.24	0.81	0.00	9.00
Time 3				
EBI Promotion in Squadron	9.04	7.40	1.00	85.00
EBI Self-use	0.20	0.82	0.00	17.00
EBI Use by Friends	0.35	1.14	0.00	17.00

Table 12. *Correlations Among EBI Dissemination and Uptake Variables*

	EBI Promotion in Squadron	EBI Self-use	EBI Use by Friends
EBI Promotion in Squadron	-	.24***	.37***
EBI Self-use	.25***	-	.29***
EBI Use by Friends	.34***	.34***	-

Note. T2 correlations above and T3 correlations below diagonal; *** $p < .001$.

Table 13. *Mean Differences in Process Factors over Time*

Variable Pair	Mean Diff	*t* (*df*)
Number of Check-in Dates Scheduled T1 – T2	.20	*t* (44) = .87; *p* = .39
Number of Check-in Dates Scheduled T1 – T3	**-.63**	***t* (40) = -2.48; *p* < .05**
Number of Check-in Dates Scheduled T2 - T3	**-.96**	***t* (45) = -3.82; *p* <.001**
Number of Risk and Protective Factors Selected T1-T2	-.25	*t* (48) = -1.41; *p* = .17
Number of Risk and Protective Factors Selected T2 – T3	-.31	*t* (47) = -1.60; *p* = .12
Number of Risk and Protective Factors Selected T1 – T3	**-.55**	***t* (46) = -3.58; *p* <.001**
Number of Interventions Selected T1 - T2	-.78	*t* (48) = -1.84; *p* = .07
Number of Interventions Selected T2 – T3	.25	*t* (47) = .63; *p* = .53
Number of Interventions Selected T1 – T3	**-.70**	***t* (46) = -2.17; *p* < .05**
Number of Anticipated Benefits T1 – T2	.16	*t* (48) = .65; *p* = .52
Number of Anticipated Benefits T2 – T3	**-.54**	***t* (47) = -2.02; *p* < .05**
Number of Anticipated Benefits T1 – T3	-.53	*t* (46) = -1.90; *p* = .06
Number of Airmen Engagement Strategies T1 – T2	.14	*t* (48) = .78; *p* = .44
Number of Airmen Engagement Strategies T2 – T3	-.33	*t* (47) = -1.28; *p* = .22
Number of Airmen Engagement Strategies T1 – T3	-.36	*t* (46) = -1.49; *p* = .15
Number of Barriers Identified T1 – T2	-.23	*t* (25) = -1.30 *p* = .21
Number of Barriers Identified T2 – T3	.19	*t* (25) = .68; *p* = .50
Number of Barriers Identified T1 – T3	.11	*t* (46) = .53; *p* = .60
Commander Satisfaction with NORTH STAR T1 – T2	-.08	*t* (33) = -.56; *p* = .58
Commander Satisfaction with NORTH STAR T2 – T3	-.01	*t* (34) = -.14; *p* = .89
Commander Satisfaction with NORTH STAR T1 – T3	-.09	*t* (34) = -.67; *p* = .51
Commander Positive Expectations of NORTH STAR T1 – T2	-.07	*t* (32) = -.63; *p* = .53
Commander Positive Expectations of NORTH STAR T2 – T3	.05	*t* (34) = .52; *p* = .61
Commander Positive Expectations of NORTH STAR T1 – T3	-.04	*t* (34) = -.38; *p* = .71
Airmen Positive Reception of NORTH STAR T2 – T3	-.27	*t* (25) = -1.66; *p* = .11
Commander Satisfaction with Survey Participation Rate T2 – T3	**-.54**	***t* (45) = -3.21; *p* < .01**
Guide Reported Commander Engagement T1 – T2	.05	*t* (39) = .50; *p* = .62
Guide Reported Commander Engagement T2 – T3	.16	*t* (39) = 1.70; *p* = .10
Guide Reported Commander Engagement T1 – T3	.18	*t* (47) = 1.74; *p* = .09
Guide Rating of Action Plan Implementation Likelihood T1 – T2	.12	*t* (38) = .86; *p* = .40
Guide Rating of Action Plan Implementation Likelihood T2 – T3	.11	*t* (39) = .73; *p* = .47
Guide Rating of Action Plan Implementation Likelihood T1 – T3	.19	*t* (46) = 1.27; *p* = .21
Guide Reported Engagement by Others T1 – T2	-.02	*t* (24) = -.14; *p* = .89
Guide Reported Engagement by Others T2 – T3	-.02	*t* (25) = -.11; *p* = .91
Guide Reported Engagement by Others T1 – T3	-.06	*t* (26) = -.29; *p* = .77
Guide Report Ease of Scheduling Commander Briefings T1 – T2	**-.57**	***t* (39) = -4.60; *p* < .001**
Guide Report Ease of Scheduling Commander Briefings T2 – T3	**.34**	***t* (39) = 2.20; *p* < .05**
Guide Report Ease of Scheduling Commander Briefings T1 – T3	-.29	*t* (47) = -1.77; *p* = .08
Briefing Length T1 – T3	4.98	*t* (43) = 1.05; *p* = .30

Table 14. *Mean Differences in Process Factors over Time for Units without Embedded Support Staff*

Variable Pair	Mean Diff	*t* (*df*)
Number of Check-in Dates Scheduled T1 – T2	-.29	*t* (20) = -.95; *p* = .36
Number of Check-in Dates Scheduled T1 – T3	**-1.26**	***t* (18) = -3.02; *p* < .01**
Number of Check-in Dates Scheduled T2 - T3	**-1.05**	***t* (20) = -2.45; *p* < .05**
Number of Risk and Protective Factors Selected T1-T2	-.18	*t* (21) = -.58; *p* = .57
Number of Risk and Protective Factors Selected T2 – T3	-.32	*t* (21) = -.89; *p* = .38
Number of Risk and Protective Factors Selected T1 – T3	-.52	*t* (20) = -1.86; *p* = .08
Number of Interventions Selected T1 - T2	-.91	*t* (21) = -1.38; *p* = .18
Number of Interventions Selected T2 – T3	.27	*t* (21) = 1.71; *p* = .70
Number of Interventions Selected T1 – T3	-1.00	*t* (20) = -1.95; *p* = .07
Number of Anticipated Benefits T1 – T2	.36	*t* (21) = 1.03; *p* = .31
Number of Anticipated Benefits T2 – T3	-.32	*t* (21) = -.96; *p* = .35
Number of Anticipated Benefits T1 – T3	-.09	*t* (20) = -.23; *p* = .82
Number of Airmen Engagement Strategies T1 – T2	.18	*t* (21) = .66; *p* = .52
Number of Airmen Engagement Strategies T2 – T3	-.36	*t* (21) = -.85; *p* = .41
Number of Airmen Engagement Strategies T1 – T3	-.38	*t* (20) = -1.16; *p* = .26
Number of Barriers Identified T1 – T2	.08	*t* (11) = .43 *p* = .67
Number of Barriers Identified T2 – T3	-.31	*t* (12) = -.69; *p* = .50
Number of Barriers Identified T1 – T3	-.19	*t* (20) = -.58; *p* = .57
Commander Satisfaction with NORTH STAR T1 – T2	-.03	*t* (14) = -.19; *p* = .85
Commander Satisfaction with NORTH STAR T2 – T3	.11	*t* (13) = .82; *p* = .43
Commander Satisfaction with NORTH STAR T1 – T3	-.16	*t* (15) = -.86; *p* = .40
Commander Positive Expectations of NORTH STAR T1 – T2	.09	*t* (13) = .49; *p* = .63
Commander Positive Expectations of NORTH STAR T2 – T3	.19	*t* (13) = 1.47; *p* = .17
Commander Positive Expectations of NORTH STAR T1 – T3	.04	*t* (15) = .32; *p* = .75
Airmen Positive Reception of NORTH STAR T2 – T3	-.25	*t* (11) = -.74; *p* = .48
Commander Satisfaction with Survey Participation Rate T2 – T3	**-.75**	***t* (19) = -2.78; *p* < .05**
Guide Reported Commander Engagement T1 – T2	.03	*t* (18) = .17; *p* = .87
Guide Reported Commander Engagement T2 – T3	**.32**	***t* (18) = 2.36; *p* < .05**
Guide Reported Commander Engagement T1 – T3	.24	*t* (20) = 1.36; *p* = .19
Guide Rating of Action Plan Implementation Likelihood T1 – T2	.11	*t* (18) = .64; *p* = .53
Guide Rating of Action Plan Implementation Likelihood T2 – T3	.47	*t* (18) = 1.92; *p* = .07
Guide Rating of Action Plan Implementation Likelihood T1 – T3	**.57**	***t* (20) = 2.34; *p* < .05**
Guide Report Ease of Scheduling Commander Briefings T1 – T2	**-.76**	***t* (18) = -4.13; *p* < .001**
Guide Report Ease of Scheduling Commander Briefings T2 – T3	**.68**	***t* (18) = 3.15; *p* < .01**
Guide Report Ease of Scheduling Commander Briefings T1 – T3	-.09	*t* (20) = -.33; *p* = .75
Briefing Length T1 – T3	10.80	*t* (19) = 1.61; *p* = .12

Table 15. *Mean Differences in Process Factors over Time for Units with Embedded Support Staff*

Variable Pair	Mean Diff	*t* (*df*)
Number of Check-in Dates Scheduled T1 – T2	.63	*t* (23) = 1.93; *p* = .07
Number of Check-in Dates Scheduled T1 – T3	-.09	*t* (21) = -.34; *p* = .74
Number of Check-in Dates Scheduled T2 - T3	**-.88**	***t* (24) = -2.97; *p* < .01**
Number of Risk and Protective Factors Selected T1-T2	-.30	*t* (26) = -1.55; *p* = .13
Number of Risk and Protective Factors Selected T2 – T3	-.31	*t* (25) = -1.50; *p* = .15
Number of Risk and Protective Factors Selected T1 – T3	-.58	*t* (25) = -3.43; *p* < .01
Number of Interventions Selected T1 - T2	-.67	*t* (26) = -1.20; *p* = .24
Number of Interventions Selected T2 – T3	.23	*t* (25) = 1.71; *p* = .62
Number of Interventions Selected T1 – T3	-.46	*t* (25) = -1.11; *p* = .28
Number of Anticipated Benefits T1 – T2	.00	*t* (26) = 0.00; *p* = 1.00
Number of Anticipated Benefits T2 – T3	-.73	*t* (25) = -.1.78; *p* = .09
Number of Anticipated Benefits T1 – T3	-.88	*t* (25) = -2.40; *p* < .05
Number of Airmen Engagement Strategies T1 – T2	.11	*t* (26) = .44; *p* = .66
Number of Airmen Engagement Strategies T2 – T3	-.31	*t* (25) = -.92; *p* = .37
Number of Airmen Engagement Strategies T1 – T3	-.35	*t* (25) = -.98; *p* = .34
Number of Barriers Identified T1 – T2	-.50	*t* (13) = -1.84 *p* = .09
Number of Barriers Identified T2 – T3	**.69**	***t* (12) = 2.25; *p* < .05**
Number of Barriers Identified T1 – T3	.35	*t* (25) = 1.40; *p* = .18
Commander Satisfaction with NORTH STAR T1 – T2	-.11	*t* (18) = -.54; *p* = .59
Commander Satisfaction with NORTH STAR T2 – T3	-.10	*t* (20) = -.66; *p* = .52
Commander Satisfaction with NORTH STAR T1 – T3	-.03	*t* (18) = -.15; *p* = .89
Commander Positive Expectations of NORTH STAR T1 – T2	-.19	*t* (18) = -1.48; *p* = .16
Commander Positive Expectations of NORTH STAR T2 – T3	-.05	*t* (20) = -.38; *p* = .71
Commander Positive Expectations of NORTH STAR T1 – T3	-.11	*t* (18) = -.69; *p* = .50
Airmen Positive Reception of NORTH STAR T2 – T3	**-.29**	***t* (13) = -2.83; *p* < .05**
Commander Satisfaction with Survey Participation Rate T2 – T3	-.39	*t* (25) = -1.79; *p* = .09
Guide Reported Commander Engagement T1 – T2	.07	*t* (20) = .54; *p* = .59
Guide Reported Commander Engagement T2 – T3	.02	*t* (20) = .18; *p* = .86
Guide Reported Commander Engagement T1 – T3	.13	*t* (26) = 1.06; *p* = .30
Guide Rating of Action Plan Implementation Likelihood T1 – T2	.13	*t* (19) = .58; *p* = .57
Guide Rating of Action Plan Implementation Likelihood T2 – T3	-.21	*t* (20) = -1.31; *p* = .21
Guide Rating of Action Plan Implementation Likelihood T1 – T3	-.12	*t* (25) = -.68; *p* = .50
Guide Report Ease of Scheduling Commander Briefings T1 – T2	**-.39**	***t* (20) = -2.45; *p* < .05**
Guide Report Ease of Scheduling Commander Briefings T2 – T3	.02	*t* (20) = .12; *p* =.91
Guide Report Ease of Scheduling Commander Briefings T1 – T3	**-.44**	***t* (26) = -.2.45; *p* < .05**
Briefing Length T1 – T3	.13	*t* (23) = .02; *p* = .99

Table 16. *Correlations between process factors and change in secretive problems from T1-T3*

	Alcohol	Partner Mal	Suicidality
Number of Check-in Dates Scheduled T1	.09	.02	**-.32***
Number of Check-in Dates Scheduled T2	**.31***	-.12	-.03
Number of Check-in Dates Scheduled T3	.20	.15	.08
Number of Risk and Protective Factors Selected T1	-.03	-.10	.02
Number of Risk and Protective Factors Selected T2	.05	.11	-.04
Number of Risk and Protective Factors Selected T3	-.16	.06	-.02
Number of Interventions Selected T1	-.06	-.19	-.01
Number of Interventions Selected T2	-.09	.00	.15
Number of Interventions Selected T3	.05	.05	.00
Number of Anticipated Benefits T1	.08	-.04	.06
Number of Anticipated Benefits T2	-.17	-.02	.20
Number of Anticipated Benefits T3	-.24	.01	-.07
Number of Airmen Engagement Strategies T1	-.07	**-.33***	-.08
Number of Airmen Engagement Strategies T2	.12	-.07	.00
Number of Airmen Engagement Strategies T3	.04	**.37****	-.16
Number of Strategies for Checking in with Airmen T1	.03	-.18	-.11
Number of Strategies for Checking in with Airmen T2	.03	.02	.19
Number of Strategies for Checking in with Airmen T3	-.11	**.29***	.04
Number of Barriers Identified T1	.02	**-.31***	-.12
Number of Barriers Identified T2	-.03	**-.41***	-.08
Number of Barriers Identified T3	.01	.19	-.01
Commander Satisfaction with NORTH STAR T1	.15	.17	.04
Commander Satisfaction with NORTH STAR T2	.01	.13	**.38***
Commander Satisfaction with NORTH STAR T3	.09	.08	-.17
Commander Positive Expectations of NORTH STAR T1	.04	.18	-.18
Commander Positive Expectations of NORTH STAR T2	-.11	-.04	.20
Commander Positive Expectations of NORTH STAR T3	.06	.13	**-.33***
Airmen Positive Reception of NORTH STAR T2	-.12	-.27	-.12
Airmen Positive Reception of NORTH STAR T3	**-.35***	.13	.06
Guide Reported Commander Engagement T1	-.07	.05	.26
Guide Reported Commander Engagement T2	.07	.00	.08
Guide Reported Commander Engagement T3	.10	.12	**.32***
Guide Rating of Action Plan Implementation Likelihood T1	.08	.12	.14
Guide Rating of Action Plan Implementation Likelihood T2	.20	.01	.01
Guide Rating of Action Plan Implementation Likelihood T3	.20	.08	.20
Guide Reported Engagement by Others T1	-.03	-.20	-.13
Guide Reported Engagement by Others T2	-.12	-.28	.02
Guide Reported Engagement by Others T3	.21	.29	-.02
Guide Report Ease of Scheduling Commander Briefings T1	.02	.07	.11
Guide Report Ease of Scheduling Commander Briefings T2	.21	.11	.06
Guide Report Ease of Scheduling Commander Briefings T3	-.12	.08	-.16
Briefing Length T1	-.12	-.18	**-.43****
Briefing Length T3	**.32***	**.38****	.27

Table 17. *Mean Difference in Change in Alcohol Use from T1-T3 by Process Constructs*

Construct	Mean Difference	*t* (*df*)
Activities Planned other than NORTH STAR T1	-.00	*t* (47) = -.021; *p* = .98
Activities Planned other than NORTH STAR T2	.02	*t* (39) = 1.47; *p* = .15
Activities Planned other than NORTH STAR T3	-.00	*t* (46) = -.33; *p* = .74
Commander Adapted Action Plan at T2	.00	*t* (23) = .22; *p* = .83
Commander Adapted Action Plan at T3	-.01	*t* (37) = -.67; *p* = .51
Commander Intent to Change Action Plan T2	.01	*t* (24) = .41; *p* = .69
Unit has Embedded Personnel at T2	.01	*t* (39) = .55; *p* = .59
Unit has Embedded Personnel at T3	-.01	*t* (46) = -.43; *p* = .67
Provided Time to Complete Survey during Workday T1	-.00	*t* (48) = -.18; *p* = .86
Provided Time to Complete Survey during Workday T2	-.01	*t* (17) = .73; *p* = .48
Provided Time to Complete Survey during Workday T3	.01	*t* (40) = .68; *p* = .51

Table 18. *Mean Difference in Change in Partner Maltreatment from T1-T3 by Process Constructs*

Construct	Mean Difference	*t* (*df*)
Activities Planned other than NORTH STAR T1	.02	*t* (47) = 1.33; *p* = .19
Activities Planned other than NORTH STAR T2	.02	*t* (39) = 1.47; *p* = .15
Activities Planned other than NORTH STAR T3	.02	*t* (46) = 1.26; *p* = .22
Commander Adapted Action Plan at T2	-.01	*t* (23) = -.27; *p* = .79
Commander Adapted Action Plan at T3	**-.03**	***t* (37) = -2.04; *p* < .05**
Commander Intent to Change Action Plan T2	-.01	*t* (24) = -.36; *p* = .72
Unit has Embedded Personnel at T2	.01	*t* (39) = .61; *p* = .55
Unit has Embedded Personnel at T3	-.01	*t* (46) = -.60; *p* = .55
Provided Time to Complete Survey during Workday T1	-.02	*t* (48) = -.92; *p* = .36
Provided Time to Complete Survey during Workday T2	-.03	*t* (17) = -1.27; *p* = .22
Provided Time to Complete Survey during Workday T3	-.01	*t* (40) = -.38; *p* = .71

Table 19. *Mean Difference in Change in Suicidality from T1-T3 by Process Constructs*

Construct	Mean Difference	*t* (*df*)
Activities Planned other than NORTH STAR T1	.01	*t* (47) = .39; *p* = .70
Activities Planned other than NORTH STAR T2	.00	*t* (39) = .14; *p* = .89
Activities Planned other than NORTH STAR T3	**.02**	***t* (46) = 2.07; *p* <.05**
Commander Adapted Action Plan at T2	.00	*t* (23) = .18; *p* = .86
Commander Adapted Action Plan at T3	-.00	*t* (37) = -.27; *p* = .79
Commander Intent to Change Action Plan T2	-.03	*t* (24) = -1.69; *p* = .10
Unit has Embedded Personnel at T2	.01	*t* (39) = .87; *p* = .39
Unit has Embedded Personnel at T3	.01	*t* (46) = .58; *p* = .57
Provided Time to Complete Survey during Workday T1	.02	*t* (48) = .99; *p* = .33
Provided Time to Complete Survey during Workday T2	-.01	*t* (17) = -.90 *p* = .38
Provided Time to Complete Survey during Workday T3	-.01	*t* (40) = -.79; *p* = .44

Table 20. *Regression Analyses predicting Alcohol Misuse at T3, controlling for Alcohol Misuse at T1*

Construct	Overall F (df)	Alcohol T1 Beta	Process Beta
Number of Check-in Dates Scheduled T1	F (2,45) = 1.64; p = .21	.25; p = .09	.09; p = .53
Number of Check-in Dates Scheduled T2	F (2,49) = 5.10; p < .01	**.36; p < .01**	**.27; p < .05**
Number of Check-in Dates Scheduled T3	F (2,44) = 4.96; p <.05	**.38; p < .01**	.21; p = .13
Activities Planned other than NORTH STAR T1	F (2,44) = 1.30; p = .28	.22; p = .15	.08; p = .60
Activities Planned other than NORTH STAR T2	F (2,38) = 2.25; p = .12	**.35; p < .05**	-.08; p = .52
Activities Planned other than NORTH STAR T3	F (2,44) = 3.58; p < .05	**.38; p < .001**	.01; p = .93
Number of Risk and Protective Factors Selected T1	F (2,49) = 2.49; p = .09	**.31; p < .05**	-.01; p = .96
Number of Interventions Selected T1	F (2,49) = 3.43; p < .05	**.28; p < .05**	-.18; p = .20
Number of Anticipated Benefits T1	F (2,49) = 2.49; p = .09	**.31; p < .05**	.01; p = .93
Number of Airmen Engagement Strategies T1	F (2,49) = 2.53; p = .09	**.31; p < .05**	-.04; p = .77
Number of Strategies for Checking in with Airmen T1	F (2, 49) = 2.50; p = .09	**.31; p < .05**	-.02; p = .87
Number of Barriers Identified T1	F (2, 49) = 2.81; p = .07	**.30; p < .05**	.11; p = .45
Commander Satisfaction with NORTH STAR T1	F (2, 41) = 1.24; p = .30	.23; p = .17	-.05; p = .77
Commander Positive Expectations of NORTH STAR T1	F (2, 41) = 1.58; p = .22	.22; p = .17	-.13; p = .40
Provided Time to Complete Survey during Workday T1	F (2, 46) = 3.06; p = .06	**.31; p < .05**	.13; p = .39
Guide Reported Commander Engagement T1	F (2, 49) = 3.12; p < .05	**.30; p < .05**	-.15; p = .29
Guide Rating of Action Plan Implementation Likelihood T1	F (2, 48) = 3.44; p < .05	.25; p = .09	-.19; p = .21
Guide Reported Engagement by Others T1	F (2, 31) = 2.36; p = .11	.02; p = .92	-.37; p = .06
Guide Report Ease of Scheduling Commander Briefings T1	F (2, 49) = 2.49; p = .09	**.31; p < .05**	.00; p = .98
Briefing Length T1	F (2, 46) = 2.46; p = .10	**.32; p < .05**	-.04; p = .76
Number of Risk and Protective Factors Selected T2	F (2, 49) = 3.23; p <.05	**.31; p < .05**	.13; p = .37
Number of Interventions Selected T2	F (2, 49) = 3.98; p < .05	**.30; p < .05**	-.20; p = .15
Number of Anticipated Benefits T2	F (2, 49) = 2.83; p = .07	**.34; p < .05**	-.05; p = .75
Number of Airmen Engagement Strategies T2	F (2, 49) = 3.32; p < .05	**.32; p < .05**	.14; p = .33
Number of Strategies for Checking in with Airmen T2	F (2, 49) = 2.82; p = .07	**.32; p < .05**	.04; p = .77
Number of Barriers Identified T2	F (2, 25) = 2.18; p = .14	.37; p = .09	.07; p = .73
Commander Satisfaction with NORTH STAR T2	F (2, 38) = 2.97; p = .06	.29; p = .08	-.19; p = .25
Commander Positive Expectations of NORTH STAR T2	F (2, 37) = 3.18; p < .05	**.32; p < .05**	-.21; p = .18

Airmen Positive Reception of NORTH STAR T2	*F* (2, 26) = 3.19; *p* = .06	**.45; *p* < .05**	-.11; *p* = .55
Commander Satisfaction with Survey Participation Rate T2	*F* (2, 48) = 3.11; *p* < .05	**.36; *p* < .05**	-.07; *p* = .63
Perceived Ability to Increase participation Rate T2	*F* (2, 49) = 3.57; *p* < .05	.28; *p* = .06	-.17; *p* = .24
Has Resources to Increase Participation Rate T2	*F* (2, 49) = 4.91; *p* < .01	**.38; *p* < .01**	-.27; *p* = .06
Perceived Airmen Reaction to Action Plan T2	*F* (2, 25) = 3.17; *p* = .06	**.50; *p* < .05**	-.19; *p* = .36
Perceived Likelihood of Airmen using EBIs T2	*F* (2, 26) = 2.98; *p* = .07	**.44; *p* < .05**	-.03; *p* = .86
Commanders Adapted Action Plan T2	*F* (2, 24) = 3.08; *p* = .07	**.47; *p* < .05**	-.04; *p* = .84
Commander Intent to Adapt Action Plan T2	*F* (2, 25) = 3.61; *p* < .05	**.48; *p* < .05**	-.09; *p* = .63
Unit has Embedded Providers T2	*F* (2, 38) = 3.49; *p* < .05	.26; *p* = .12	-.25; *p* = .13
Provided Time to Complete Survey during Workday T2	*F* (2, 18) = .15; *p* = .87	.14; *p* = .60	.01; *p* = .96
Guide Reported Commander Engagement T2	*F* (2, 40) = 1.26; *p* = .29	.25; *p* = .13	-.02; *p* = .89
Guide Rating of Action Plan Implementation Likelihood T2	*F* (2, 40) = 1.38; *p* = .27	.27; *p* = .11	.08; *p* = .63
Guide Reported Engagement by Others T2	F (2, 32) = .98; *p* = .39	.22; *p* = .22	-.13; *p* = .48
Guide Report Ease of Scheduling Commander Briefings T2	*F* (2, 40) = 1.26; *p* = .30	.24; *p* = .18	-.01; *p* = .94
Number of Risk and Protective Factors Selected T3	*F* (2, 46) = 3.47; *p* < .05	**.34; *p* < .05**	-.15; *p* = .29
Number of Interventions Selected T3	*F* (2, 46) = 4.48; *p* < .05	.23; *p* = .13	-.26; *p* = .009
Number of Anticipated Benefits T3	*F* (2, 46) = 2.86; *p* = .07	**.35; *p* < .05**	-.04; *p* = .79
Number of Airmen Engagement Strategies T3	*F* (2, 46) = 2.83; *p* = .07	**.34; *p* < .05**	-.02; *p* = .91
Number of Strategies for Checking in with Airmen T3	*F* (2, 46) = 3.64; *p* < .05	**.33; *p* < .05**	-.17; *p* = .23
Number of Barriers Identified T3	*F* (2, 46) = 3.08; *p* = .06	**.33; *p* < .05**	-.10; *p* = .50
Commander Satisfaction with NORTH STAR T3	*F* (2, 41) = 2.85; *p* = .07	**.36; *p* < .05**	.03; *p* = .87
Commander Positive Expectations of NORTH STAR T3	*F* (2, 41) = 3.01; *p* = .06	**.35; *p* < .05**	.08; *p* = .58
Perceived Airmen Reaction to Action Plan T3	*F* (2, 45) = 4.00; *p* < .05	**.43; *p* < .01**	-.13; *p* = .39
Commander Satisfaction with Survey Participation Rate T3	*F* (2, 45) = 3.66; *p* < .05	**.38; *p* < .01**	-.06; *p* = .68
Perceived Ability to Increase participation Rate T3	*F* (2, 45) = 3.62; *p* < .05	**.39; *p* < .01**	.05; *p* = .74
Perceived Airmen Reaction to Action Plan T3	*F* (2, 45) = 4.53; *p* < .05	**.43; *p* < .01**	-.19; *p* = .20
Perceived Likelihood of Airmen using EBIs T2	*F* (2, 42) = 2.50; *p* = .10	**.35; *p* < .05**	-.11; *p* = .50
Commanders Adapted Action Plan T3	*F* (2, 36) = 1.08; *p* = .35	.23; *p* = .18	.08; *p* = .62
Commander Intent to Adapt Action Plan T3	*F* (2, 40) = 2.13; *p* = .13	.32; *p* = .06	.01; *p* = .96

Unit has Embedded Providers T3	F (2, 44) = 4.33; p < .05	**.31; p < .05**	-.17; p = .26
Provided Time to Complete Survey during Workday T3	F (2, 38) = 2.39; p = .11	**.32; p < .05**	-.14; p = .38
Guide Reported Commander Engagement T3	F (2, 48) = 3.21; p < .05	**.35; p < .05**	.06; p = .70
Guide Rating of Action Plan Implementation Likelihood T3	F (2, 48) = 3.72; p < .05	**.36; p < .01**	.14; p = .31
Guide Reported Engagement by Others T3	F (2, 39) = 1.77; p = .18	.30; p = .07	.05; p = .75
Guide Report Ease of Scheduling Commander Briefings T3	F (2, 48) = 3.14; p < .05	**.35; p < .05**	-.17; p = .87
Briefing Length T3	F (2, 47) = 6.49; p < .01	**.38; p < .01**	**.32; p < .05**

Table 21. *Regression Analyses predicting Partner Maltreatment at T3, controlling for Partner Maltreatment at T1*

Construct	Overall *F* (*df*)	Partner Maltreatment T1 Beta	Process Beta
Number of Check-in Dates Scheduled T1	*F* (2,45) = 0.22; *p* = .80	.04; *p* = .77	.09; *p* = .55
Number of Check-in Dates Scheduled T2	*F* (2,49) = 0.35 *p* = .71	.00; *p* = .99	-.12; *p* = .41
Number of Check-in Dates Scheduled T3	*F* (2,44) = 0.50; *p* = .95	-.03; *p* = .86	.04; *p* = .82
Activities Planned other than NORTH STAR T1	*F* (2,44) = 0.09; *p* = .91	.04; *p* = .80	-.06; *p* = .70
Activities Planned other than NORTH STAR T2	*F* (2,38) = 0.46; *p* = .64	.05; *p* = .76	-.16; *p* = .35
Activities Planned other than NORTH STAR T3	*F* (2,44) = 0.16; *p* = .85	-.02; *p* = .90	-.08; *p* = .60
Number of Risk and Protective Factors Selected T1	*F* (2,49) = 0.00; *p* = 1.00	.00; *p* = .98	.00; *p* = 1.00
Number of Interventions Selected T1	*F* (2,49) = 0.34; *p* = .71	.02; *p* = .90	-.12; *p* = .41
Number of Anticipated Benefits T1	*F* (2,49) = 0.05; *p* = .95	.00; *p* = 1.00	.05; *p* = .75
Number of Airmen Engagement Strategies T1	*F* (2,49) = 0.55; *p* = .58	.05; *p* = .74	-.16; *p* = .30
Number of Strategies for Checking in with Airmen T1	*F* (2, 49) = 0.04; *p* = .96	.02; *p* = .92	-.04; *p* = .77
Number of Barriers Identified T1	*F* (2, 49) = 0.64; *p* = .53	.04; *p* = .77	-.17; *p* = .27
Commander Satisfaction with NORTH STAR T1	*F* (2, 41) = 0.81; *p* = .45	.18; *p* = .26	.10; *p* = .51
Commander Positive Expectations of NORTH STAR T1	*F* (2, 41) = 0.59; *p* = .56	.17; *p* = .31	-.01; *p* = .96
Provided Time to Complete Survey during Workday T1	*F* (2, 46) = 0.46; *p* = .63	.07; *p* = .66	.13; *p* = .38
Guide Reported Commander Engagement T1	*F* (2, 49) = 0.15; *p* = .86	.00; *p* = .99	.08; *p* = .59
Guide Rating of Action Plan Implementation Likelihood T1	*F* (2, 48) = 0.09; *p* = .91	.00; *p* = .98	.06; *p* = .67
Guide Reported Engagement by Others T1	*F* (2, 31) = 0.56; *p* = .58	-.12; *p* = .52	-.13; *p* = .49
Guide Report Ease of Scheduling Commander Briefings T1	*F* (2, 49) = 0.40; *p* = .67	.00; *p* = .99	.13; *p* = .38
Briefing Length T1	*F* (2, 46) = 0.24; *p* = .79	-.01; *p* = .94	.11; *p* = .50
Number of Risk and Protective Factors Selected T2	*F* (2, 49) = 0.77; *p* = .47	-.02; *p* = .92	.18; *p* = .22
Number of Interventions Selected T2	*F* (2, 49) = 0.53; *p* = .59	-.03; *p* = .83	.15; *p* = .31
Number of Anticipated Benefits T2	*F* (2, 49) = 0.02; *p* = .98	-.01; *p* = .96	.02; *p* = .86
Number of Airmen Engagement Strategies T2	*F* (2, 49) = 0.60; *p* = .55	-.06; *p* = .70	.17; *p* = .28
Number of Strategies for Checking in with Airmen T2	*F* (2, 49) = 0.68; *p* = .51	-.04; *p* = .80	.17; *p* = .25
Number of Barriers Identified T2	*F* (2, 25) = 2.25; *p* = .13	.08; *p* = .68	**-.41; *p* < .05**
Commander Satisfaction with NORTH STAR T2	*F* (2, 38) = 0.08; *p* = .92	-.01; *p* = .97	-.07; p = .70

Commander Positive Expectations of NORTH STAR T2	*F* (2, 37) = 0.01; *p* = .99	.01 *p* = .96	-.02; *p* = .89
Airmen Positive Reception of NORTH STAR T2	*F* (2, 26) = 0.60; *p* = .55	.13; *p* = .54	-.20 *p* = .33
Commander Satisfaction with Survey Participation Rate T2	*F* (2, 48) = 0.68; *p* = .51	-.01; *p* = .93	.17; *p* = .25
Perceived Ability to Increase participation Rate T2	*F* (2, 49) = 0.02; *p* = .98	-.01; *p* = .97	.03; *p* = .84
Has Resources to Increase Participation Rate T2	*F* (2, 49) = 0.00; *p* =1.00	-.00; *p* = .98	.00; *p* = .99
Perceived Airmen Reaction to Action Plan T2	F (2, 25) = 0.91; *p* = .42	.14; *p* = .50	-.25; *p* = .23
Perceived Likelihood of Airmen using EBIs T2	*F* (2, 26) = 0.31; *p* = .74	.12; *p* = .58	-.13; *p* = .52
Commanders Adapted Action Plan T2	*F* (2, 24) = 0.42; *p* = .67	.14; *p* = .52	.12; *p* = .56
Commander Intent to Adapt Action Plan T2	*F* (2, 25) = 0.21; *p* = .81	.13; *p* = .55	-.03; *p* = .89
Unit has Embedded Providers T2	*F* (2, 38) = 0.51; *p* = .61	.02; *p* = .92	-.16; *p* = .33
Provided Time to Complete Survey during Workday T2	*F* (2, 18) = 1.37; *p* = .28	.26; *p* = .27	.31; *p* = .20
Guide Reported Commander Engagement T2	*F* (2, 40) = 0.33; *p* = .73	-.02; *p* = .91	-.13; *p* = .43
Guide Rating of Action Plan Implementation Likelihood T2	*F* (2, 40) = 0.02; *p* = .98	-.00; *p* = .99	-.03; *p* = .86
Guide Reported Engagement by Others T2	*F* (2, 32) = 0.73; *p* = .49	.03; *p* = .89	-.22; *p* = .24
Guide Report Ease of Scheduling Commander Briefings T2	*F* (2, 40) = 0.00; *p* = 1.00	.00; *p* = 1.00	.01; *p* = .96
Number of Risk and Protective Factors Selected T3	*F* (2, 46) = 0.01; *p* = .99	-.00; *p* = .99	.02; *p* = .90
Number of Interventions Selected T3	*F* (2, 46) = 0.09; *p* = .92	-.02; *p* = .92	-.07; *p* = .68
Number of Anticipated Benefits T3	*F* (2, 46) = 0.15; *p* = .86	-.01; *p* = .95	-.08; *p* = .59
Number of Airmen Engagement Strategies T3	*F* (2, 46) = 2.13; *p* = .13	.08; *p* = .59	**.31; *p* < .05**
Number of Strategies for Checking in with Airmen T3	*F* (2, 46) = 0.35; *p* = .71	.03; *p* = .83	.13; *p* = .41
Number of Barriers Identified T3	*F* (2, 46) = 0.00; *p* = 1.00	.00; *p* = 1.00	.01; *p* = .93
Commander Satisfaction with NORTH STAR T3	*F* (2, 41) = 0.04; *p* = .96	.01; *p* = .96	.04; *p* = .79
Commander Positive Expectations of NORTH STAR T3	*F* (2, 41) = 0.08; *p* = .93	.01; *p* = .97	.06; *p* = .70
Perceived Airmen Reaction to Action Plan T3	*F* (2, 45) = 0.34; *p* = .72	-.05; *p* = .74	-.13; *p* = .42
Commander Satisfaction with Survey Participation Rate T3	*F* (2, 45) = 0.26; *p* = .77	.05; *p* = .78	.13; *p* = .48
Perceived Ability to Increase participation Rate T3	*F* (2, 45) = 0.08; *p* = .93	-.01; *p* = .96	-.06; *p* = .71
Perceived Airmen Reaction to Action Plan T3	*F* (2, 45) = 0.08; *p* = .93	-.03; *p* = .83	-.06; *p* = .70
Perceived Likelihood of Airmen using EBIs	*F* (2, 42) = 1.53; *p* = .23	-.06; *p* = .72	-.27; *p* = .09

T2			
Commanders Adapted Action Plan T3	F (2, 36) = 0.39; p = .68	.04; p = .84	.16; p = .38
Commander Intent to Adapt Action Plan T3	F (2, 40) = 0.19; p = .83	-.03; p = .86	-.10; p = .56
Unit has Embedded Providers T3	F (2, 44) = 0.14; p = .87	-.02; p = .88	.08; p = .63
Provided Time to Complete Survey during Workday T3	F (2, 38) = 0.70; p = .50	.19; p = .24	.00; p = 1.00
Guide Reported Commander Engagement T3	F (2, 48) = 0.32; p = .73	.00; p = .98	.12; p = .43
Guide Rating of Action Plan Implementation Likelihood T3	F (2, 48) = 0.18; p = .84	.00; p = .98	.09; p = .56
Guide Reported Engagement by Others T3	F (2, 39) = 1.62; p = .21	-.04; p = .80	.28; p = .09
Guide Report Ease of Scheduling Commander Briefings T3	F (2, 48) = 0.01; p = .99	.00; p = .98	-.02; p = .91
Briefing Length T3	F (2, 47) = 5.98; p < .01	.00; p = 1.00	**.46; p < .001**

Table 22. *Regression Analyses predicting Suicidality at T3, controlling for Suicidality at T1*

Construct	Overall F (df)	Suicidality T1 Beta	Process Beta
Number of Check-in Dates Scheduled T1	F (2,45) = 4.98; p < .01	**.38; p < .01**	**-.28; p < .05**
Number of Check-in Dates Scheduled T2	F (2,49) = 2.52 p = .09	.26; p = .07	-.13; p = .35
Number of Check-in Dates Scheduled T3	F (2,44) = 2.65; p = .08	.30; p = .06	-.10; p = .53
Activities Planned other than NORTH STAR T1	F (2,44) = 2.63; p = .08	**.33; p < .05**	-.01; p = .96
Activities Planned other than NORTH STAR T2	F (2,38) = 1.38 p = .27	.26; p = .12	-.05; p = .77
Activities Planned other than NORTH STAR T3	F (2,44) = 3.64; p < .05	**.30; p < .05**	-.21; p = .15
Number of Risk and Protective Factors Selected T1	F (2,49) = 2.26; p = .12	**.30; p < .05**	.01; p = .95
Number of Interventions Selected T1	F (2,49) = 2.26; p = .12	**.30; p < .05**	.00; p = .98
Number of Anticipated Benefits T1	F (2,49) = 2.42; p = .10	**.30; p < .05**	.08; p = .59
Number of Airmen Engagement Strategies T1	F (2,49) = 2.27; p = .12	**.30; p < .05**	-.02; p = .90
Number of Strategies for Checking in with Airmen T1	F (2, 49) = 2.44; p = .10	**.31; p < .05**	-.08; p = .57
Number of Barriers Identified T1	F (2, 49) = 2.27; p = .12	**.30; p < .05**	-.02; p = .90
Commander Satisfaction with NORTH STAR T1	F (2, 41) = 2.55; p = .09	**.34; p < .05**	-.01; p = .95
Commander Positive Expectations of NORTH STAR T1	F (2, 41) = 5.67; p < .01	**.31; p < .05**	**-.33; p < .05**
Provided Time to Complete Survey during Workday T1	F (2, 46) = 2.53; p = .09	**.31; p < .05**	-.10; p = .48
Guide Reported Commander Engagement T1	F (2, 49) = 3.46; p < .05	**.33; p < .05**	.21; p = .15
Guide Rating of Action Plan Implementation Likelihood T1	F (2, 48) = 2.02; p = .14	**.28; p < .05**	-.02; p = .89
Guide Reported Engagement by Others T1	F (2, 31) = 1.62; p = .22	.23; p = .20	-.19; p = .28
Guide Report Ease of Scheduling Commander Briefings T1	F (2, 49) = 2.65; p = .08	**.31; p < .05**	.12; p = .40
Briefing Length T1	F (2, 46) = 3.83; p < .05	**.38; p < .01**	-.25; p = .10
Number of Risk and Protective Factors Selected T2	F (2, 49) = 2.08; p = .14	.28; p = .06	.04; p = .77
Number of Interventions Selected T2	F (2, 49) = 3.41; p < .05	.26; p = .06	.22; p = .12
Number of Anticipated Benefits T2	F (2, 49) = 2.34; p = .11	**.30; p < .05**	.11; p = .46
Number of Airmen Engagement Strategies T2	F (2, 49) = 2.03; p = .14	**.28; p < .05**	.00; p = 1.00
Number of Strategies for Checking in with Airmen T2	F (2, 49) = 2.82; p = .07	**.30; p < .05**	.17; p = .23
Number of Barriers Identified T2	F (2, 25) = 0.11; p = .90	.07; p = .73	-.06; p = .78
Commander Satisfaction with NORTH STAR T2	F (2, 38) = 2.03; p = .15	.35; p = .06	.21; p = .25
Commander Positive Expectations of NORTH STAR T2	F (2, 37) = 1.77; p = .19	.26; p = .12	.16; p = .34

Airmen Positive Reception of NORTH STAR T2	*F* (2, 26) = 1.58; *p* = .23	.32; *p* = .11	-.12; *p* = .55
Commander Satisfaction with Survey Participation Rate T2	*F* (2, 48) = 2.06; *p* = .14	**.28; *p* < .05**	.06; *p* = .69
Perceived Ability to Increase participation Rate T2	*F* (2, 49) = 2.04; *p* = .14	**.28; *p* < .05**	-.02; *p* = .88
Has Resources to Increase Participation Rate T2	*F* (2, 49) = 2.23; *p* =.12	**.28; *p* < .05**	-.08; *p* = .55
Perceived Airmen Reaction to Action Plan T2	*F* (2, 25) = 5.11; *p* < .05	.35; *p* = .06	**-.42; *p* < .05**
Perceived Likelihood of Airmen using EBIs T2	*F* (2, 26) = 1.67; *p* = .21	.31; *p* = .12	.14; *p* = .48
Commanders Adapted Action Plan T2	*F* (2, 24) = 1.69; *p* = .21	.35; *p* = .10	.04; *p* = .85
Commander Intent to Adapt Action Plan T2	*F* (2, 25) = 1.98; *p* = .16	.41; *p* = .06	.24; *p* = .27
Unit has Embedded Providers T2	*F* (2, 38) = 1.66; *p* = .20	.26; *p* = .11	-.13; *p* = .43
Provided Time to Complete Survey during Workday T2	*F* (2, 18) = 1.11; *p* = .35	.11; *p* = .67	.30; *p* = .24
Guide Reported Commander Engagement T2	*F* (2, 40) = 0.35; *p* = .71	.08; *p* = .65	-.10; *p* = .57
Guide Rating of Action Plan Implementation Likelihood T2	*F* (2, 40) = 0.25; *p* = .78	.09; *p* = .57	-.06; p = .72
Guide Reported Engagement by Others T2	*F* (2, 32) = 0.23; *p* = .79	.11; *p* = .54	-.04; *p* = .82
Guide Report Ease of Scheduling Commander Briefings T2	*F* (2, 40) = 1.11; *p* = .34	.06; *p* = .72	.22; *p* = .18
Number of Risk and Protective Factors Selected T3	*F* (2, 46) = 2.63; *p* = .08	**.33; *p* < .05**	-.03; *p* = .84
Number of Interventions Selected T3	*F* (2, 46) = 2.68; *p* = .08	**.33; *p* < .05**	.05; *p* = .71
Number of Anticipated Benefits T3	*F* (2, 46) = 3.35; *p* < .05	**.33; *p* < .05**	-.16; *p* = .25
Number of Airmen Engagement Strategies T3	*F* (2, 46) = 2.97; *p* = .06	**.33; *p* < .05**	-.12; *p* = .42
Number of Strategies for Checking in with Airmen T3	*F* (2, 46) = 2.62; *p* = .08	**.32; *p* < .05**	.03; *p* = .85
Number of Barriers Identified T3	*F* (2, 46) = 2.86; *p* = .07	**.32; *p* < .05**	-.10; *p* = .50
Commander Satisfaction with NORTH STAR T3	*F* (2, 41) = 2.97; *p* = .06	**.32; *p* < .05**	-.13; *p* = .40
Commander Positive Expectations of NORTH STAR T3	*F* (2, 41) = 6.72; *p* < .01	**.39; *p* < .01**	**-.38; *p* < .01**
Perceived Airmen Reaction to Action Plan T3	*F* (2, 45) = 3.00; *p* = .06	**.32; *p* < .05**	-.11; *p* = .47
Commander Satisfaction with Survey Participation Rate T3	*F* (2, 45) = 2.73; *p* = .08	**.34; *p* < .05**	.03; *p* = .86
Perceived Ability to Increase participation Rate T3	*F* (2, 45) = 3.20; *p* < .05	**.31; *p* < .05**	.13; *p* = .36
Perceived Airmen Reaction to Action Plan T3	*F* (2, 45) = 2.75; *p* = .08	**.33; *p* < .05**	-.04; *p* = .80
Perceived Likelihood of Airmen using EBIs T2	*F* (2, 42) = 2.07; *p* = .14	**.31; *p* < .05**	-.07; *p* = .66
Commanders Adapted Action Plan T3	*F* (2, 36) = 2.85; *p* = .07	.32; *p* = .06	-.13; *p* = .44
Commander Intent to Adapt Action Plan T3	*F* (2, 40) = 2.78; *p* = .08	.27; *p* = .09	.22; *p* = .15

Unit has Embedded Providers T3	F (2, 44) = 2.48; p = .10	**.32; p < .05**	-.04; p = .77
Provided Time to Complete Survey during Workday T3	F (2, 38) = 3.12; p = .06	**.38; p < .05**	.08; p = .61
Guide Reported Commander Engagement T3	F (2, 48) = 3.77; p < .05	**.34; p < .05**	.22; p = .12
Guide Rating of Action Plan Implementation Likelihood T3	F (2, 48) = 3.06; p = .06	**.31; p < .05**	.15; p = .28
Guide Reported Engagement by Others T3	F (2, 39) = 1.45; p = .25	.25; p = .13	-.10; p = .53
Guide Report Ease of Scheduling Commander Briefings T3	F (2, 48) = 2.49; p = .09	**.31; p < .05**	-.06; p = .68
Briefing Length T3	F (2, 47) = 4.37; p < .05	**.30 p < .05**	.25; p = .08

Appendix D

Manuscripts submitted for publication

Slep, A. M. S., Heyman, R. E., Lorber, M. F., Baucom, K. J. W., & Linkh, D. J. (2019). *Evaluating the Effectiveness of NORTH STAR: A Community-Based Framework to Reduce Secretive Adult Problems*. Manuscript submitted for publication

* A review copy of this manuscript is included in this appendix, beginning on the following page.

Evaluating the Effectiveness of NORTH STAR: A Community-Based Framework to Reduce Secretive Adult Problems

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Abstract

We evaluated the effectiveness of NORTH STAR, a community assessment, planning, and action framework to reduce the prevalence of adults' substance misuse, family maltreatment, and suicide. One-third of U.S. Air Force (AF) bases worldwide were randomly assigned to NORTH STAR (n = 12) or to an assessment-and-feedback-only condition (n = 12). Two AF-wide, cross-sectional, anonymous, web-based surveys were conducted of randomly-selected samples assessing risk/protective factors and outcomes. Process data regarding implementation factors were also collected from Community Action Team members. NORTH STAR bases experienced a 33% absolute risk reduction in hazardous drinking rates and cumulative risk, relative to control bases — although, given the small number of bases, these were not statistically significant effects. Analyzed at the level of individuals, NORTH STAR significantly reduced intimate partner emotional abuse, child physical abuse, and suicidality, especially at sites with supportive conditions for community prevention. Given its relatively low cost, use of empirically-supported light-touch interventions, and emphasis on sustainability with existing resources, NORTH STAR may be a useful framework for prevention of a range of adult behavioral health problems that are difficult to impact.

Keywords: community, prevention, hazardous drinking, family maltreatment, suicide, military

Evaluating the Effectiveness of NORTH STAR: A Community-Based Framework to Reduce Secretive Adult Problems

Adults receiving treatment for behavioral health problems such as partner and child abuse, substance abuse problems, and suicidality represent only a small fraction of those affected (e.g., Brown, Cohen, Johnson, & Salzinger, 1998; Demyttenaere et al., 2004). These problems are stigmatized and individuals frequently do not let others know of their difficulties, leading us to label such troubles as "secretive problems" (Heyman, Slep, & Nelson, 2011). Secretive problems are prevalent in military populations. In anonymous surveys of the Air Force (AF), approximately 35% of active duty members reported substance abuse, family maltreatment, or suicidality at a clinical level, yet only 1 in 13 of those reporting a secretive problem indicated that someone in uniform was aware of it (Heyman et al., 2011). These problems also exist at sub-clinical, high-risk levels for an even larger segment of the population (e.g., Lorber, Xu, Heyman, Slep, & Beauchaine, 2018). Given the breadth of need and the lack of voluntary revelation to either formal or informal help-networks, a prevention science approach to broadly implementing effective, efficient interventions (e.g., Damschroder et al., 2009) is needed.

One challenge when designing and implementing broad-based prevention strategies is the need to be efficient. It is difficult to engage target populations in any prevention activity, so, ideally, interventions would be both effective and have broad impacts. It is unlikely, for example, that broad swaths of the population would be willing to participate in a series of separate curricula, each seeking to prevent a different adverse outcome. One approach, taken by Communities that Care (Hawkins & Catalano, 2002), is to target cross-cutting risk/protective factors (RPF). Research over the last few decades has made it clear that not only are secretive problems such as substance abuse, family maltreatment, and suicidality interconnected (e.g.,

Foran, Heyman, Slep, & U.S.A.F. Family Advocacy Research Program, 2014; Lorber et al., 2018), but they also appear to share a variety of underlying RPFs (e.g., depressive symptoms, social support) that appear in the separate literatures for each of these problems (e.g., Foran, Slep, & Heyman, 2011; Foran, Heyman, Slep, Snarr, & U.S.A.F. Family Advocacy Research Program, 2012). Given this, these problems may offer particularly efficient intervention targets when considering integrated, community level prevention.

A community-based, public health approach to prevention focused on RPFs offers the advantage of not requiring high-risk individuals to be identified and specifically connected to potentially stigmatized services. Although some complex behavioral health problems are either publicly observable (e.g., obesity) or freely and routinely discussed with health providers (e.g., smoking), many others are often hidden from service providers (e.g., substance misuse, family maltreatment). A community-wide, risk-factor-focused preventative approach allows resources to be shared with an entire community by shifting focus from problems potentially more difficult to identify to something more commonplace and less stigmatized (e.g., Hawkins et al., 2012).

We developed NORTH STAR (New Orientation for Reducing Threats to Health from Secretive problems That Affect Readiness), a prevention planning and implementation framework for adult problems, as a parallel to Communities that Care (Hawkins & Catalano, 2002), which targets adolescent problems. Like Communities that Care, NORTH STAR is a framework rather than a program, stepping community prevention leaders through implementing a local community assessment, using local data to select risk and protective factors with multiple impacts, implementing evidence-based interventions to broadly affect the selected risk and protective factors, and evaluating its impact. This approach is compatible with a limited resource context, where efficiency and sustainability are critical, making use of light touch interventions with broad reach to make population-level prevalence changes.

Implementing and evaluating population trials targeting adult behavior is arguably more challenging than those targeting adolescent behavior, where school administrators are responsible for student well-being and students are captive, facilitating assessment. Although population trials of preventative interventions are uncommon, Prinz, Sanders, Shapiro, Whitaker, & Lutzker (2009) completed one such trial on the Triple P parenting program in South Carolina. Counties were randomized to treatment or control, and three sources of public records were used to conduct the evaluation. Prinz et al.'s trial shares several theoretical underpinnings and methodological characteristics with the current study. First, the theory behind the population-level intervention supposes that people may not need to directly participate in the intervention to be affected by it. Instead, if the penetration of the intervention is sufficient, people might benefit indirectly. Although these interventions do not specify the mechanism through which this might occur, some possibilities include modeling of healthier behavior (e.g., Latkin & Knowlton, 2015), social contagion originating from those whose behavior was affected by the intervention (e.g., Perkins, Subramanian, & Christakis, 2015), or a shift in the social norms for healthy and unhealthy behaviors (e.g., Sheeran et al. 2016). Thus, the premise is that the intervention is effective at the population level, the effects should be apparent in population-based measurement. Thus, geographical areas are the units of randomization and outcomes are tested with population-level measures (in the case of Triple P) or random samples of the population (the current trial) regardless of the degree to which the individuals captured by those measures directly participated in any interventions. This is arguably a high bar to hold a prevention approach to, for it assumes (a) specific component interventions will be effective when implemented in real world settings under real world conditions, and (b) efforts to disseminate interventions will be effective in generating sufficient participation rates that the impact will be detectable at a population level. In addition, the NORTH STAR approach, as a framework for

community-based prevention, left the implementation and marketing of interventions in the hands of the communities themselves (with support), which further necessitates that communities be effective in their implementation of dissemination efforts. Although the emerging field of implementation science has begun to systematically research how to best disseminate empirically-supported prevention approaches (e.g., McHugh & Barlow, 2010), this field is young enough that these real-world efforts are based more on experience and anecdote than science. When these several implementation challenges are coupled with the logistic necessity of working with small numbers of geographic units, it becomes apparent why so few population trials for family maltreatment, substance problems, or suicidality have been conducted. That said, the need to develop effective approaches to community-based prevention efforts for these problems is clear.

This randomized, controlled trial (RCT) of an adult prevention framework employed a university-military partnership for a number of reasons. First, military bases, like schools, are semipermeable systems that are both part of and separate from their surrounding communities; thus, both systems are well-suited for comprehensive, multi-problem, focused prevention. Second, the U.S. Air Force (AF) had already (a) made a commitment to prevention of all of the targeted problems and (b) created an infrastructure to coordinate activities of relevant agencies. Third, the AF conducted a biennial survey comprising theory-driven scales of individual, family, workplace, and community functioning that could serve as both a source of information about risk and protective factors and could be the main data source for the RCT, reducing NORTH STAR's financial and time burden and increasing disseminability.

The RCT included evaluations both outcome and process (i.e., implementation factors that might impact site outcomes). We hypothesized that bases assigned to NORTH STAR, compared with those assigned to the control condition, would show reduced prevalences of

suicidality, alcohol and drug problems, partner and child abuse, and cumulative risk (from the outcome data). Furthermore, we reasoned these differences would be affected by implementation factors (e.g., supportiveness of leadership for prevention efforts, functioning of the community prevention councils; collected in the process evaluation).

Method

Design

We conducted a repeated cross-sectional RCT, randomly assigning the 24 bases into NORTH STAR vs. control with a 1:1 allocation ratio, assigned in a single block using Microsoft Excel's random number generator. Dr. Heyman conducted the randomization; bases were informed of assignment by Col. Linkh. Repeated cross-sectional designs sample each participating *community* at multiple time points, but sample separate *individuals* each time. The outcomes, secretive problems and cumulative risk, were measured in independent samples of people within each base in 2006 and 2008. As described in Atienza and King (2002) and Murray et al. (2004), the repeated cross-sectional design suites the goal of community-based interventions: to change health at the community level. Also, repeated cross-sectional designs are unaffected by attrition.

Participants

Twenty-four of the 79 Air Force bases with community prevention teams (approximately 1/3 of all AF bases with prevention teams) volunteered and enrolled in the study. Wing commanders at each base signed Memoranda of Agreement indicating their approval for participation. Data for study outcomes (i.e., secretive problems and risk/protective factors) were from the 2006 and 2008 AF Community Assessment (CA) at the participating bases. The CA is an anonymous, web-based survey administered to representative samples of Active Duty (AD) members at all AF bases. Participation at the 24 bases was 16,020 AD members and 4,833

spouses from April – June 2006 and 16,998 AD members and 3,410 spouses from April – June 2008. Analyses of individual outcomes were restricted to the AD members (*n* = 33,018). Analyses of family outcomes were limited to individuals who were in a romantic relationship and/or had children; the subsample included both AD members and, where relevant, spouses. In cases in which it was determined that both the AD member and a spouse had participated, the spouse was always selected for analysis; *n* family outcomes = 35,297. The individual outcome (AD) sample was 73.8% male; *M* age = 31.63 (*SD* = 7.65), 67.1% were married, 53.2% were parents, 21.5% were officers. The family outcomes (AD member or spouse) sample was 58.3% male; *M* age = 32.61 (*SD* = 7.65), 84.8% were married, 64.5% were parents, 23.9% were officers.

Members of the community prevention committee — "Community Action Teams" (CAT), then known then in the AF as the "Integrated Delivery System" — at each participating base also participated. CATs were introduced in the AF in the late 1990s to plan and execute integrated, cross-problem efforts to address community needs. By AF regulations, each base was required to have a CAT, comprising representatives from all agencies involved in health and wellness. Typically, CAT teams included representatives from Family Advocacy (which deals with family maltreatment); Alcohol and Drug Abuse Prevention and Treatment (ADAPT); Health and Wellness Center; Airman and Family Readiness Center; Chapel; Wellness; and often the base comptroller's office. Although the CAT did not have a budget, it did work directly with base leadership, and was required to use the CA data to identify needs and create a biennial Community Action Plan (CAP). CAT members at all participating bases were invited to participate in the NORTH STAR process evaluation surveys; *n* = 205 participated (*M* per base = 8.91, *SD* = 5.04).

Procedure

Community assessments. AD members and, where relevant, spouses anonymously completed the online CA in the springs of 2006 and 2008. The CA included measures of secretive problems and a variety of other constructs that are not of present focus.

Experimental conditions. Bases were randomly assigned to the NORTH STAR framework (the intervention condition; $n = 12$) or enhanced feedback (the control condition; $n = 12$). An activities-as-usual control was not an option given the interest in NORTH STAR and the need for randomization. Demographics variables are reported by group in Table S1.

NORTH STAR condition. Following the 2006 CA, bases in the NORTH STAR condition received a two-day visit by 1–2 members of the NORTH STAR team, comprising a 1.5-day training with the CAT, and pre- and post-training briefings to the base leadership. Training reviewed the results of the base's CA data and assisted the CAT in developing an action plan. The CA feedback report, detailed in the measures section, reported results of both secretive problems (i.e., hazardous drinking, prescription drug misuse, suicidality, intimate partner violence, child abuse), and cross-cutting, malleable RPFs (e.g., depressive symptoms, parenting satisfaction). The individual, family, workplace, and community RPFs were selected from the literature and based on the AF's Community Readiness Consultant Model (Bowen, Martin, Liston, & Nelson, 2009). The feedback report emphasized identifying interrelations among secretive problems and RPFs, with a goal of identifying RPFs that had relations to multiple problems. Once RPFs were prioritized, the CAT turned to the NORTH STAR Guidebook (Slep & Heyman, 2006), comprising interventions that were (a) empirically-supported to address one or more of the RPFs, (b) implementable on a large scale (e.g., low cost), and (c) available for implementation. The Guidebook was developed through extensive literature searching, coupled with contacting interventionists directly to (a) identify interventions that were evaluated, might be effective and disseminable, but were not yet in the literature and (b) understand the

disseminability of interventions that were in the literature but not systematically disseminated.

CAT teams considered the strength of the effectiveness evidence of each candidate intervention, as well as fit with needs and available resources to create a final plan that included two to three RPFs targeted by up to two interventions each. Once final interventions were identified, CAT teams completed a series of implementation planning exercises, identifying the number and nature of target consumers, methods of delivery, responsible parties for each task, and timelines. This implementation plan was briefed to the base leadership at the conclusion of the meeting for their approval. Plans also included easy to implement systems for tracking plan execution to provide the CAT with feedback about the quality of their implementation. After the initial visit to each NORTH STAR base, continued implementation support was provided. The research team had regular planning and implementation phone conversations with designated CAT members, provided assistance (e.g., contacting intervention developers), had quarterly conference calls with bases implementing a given intervention, moderated a listserv so bases could share questions and ideas with each other, and created an electronic newsletter.

Control condition. Control bases were sent a detailed feedback report summarizing the results of the CA that was identical to that reviewed at the NORTH STAR bases. This included much more extensive analyses of RPFs than was typically provided to bases following the CA. However, no additional training or explanation of the report occurred. Rarely, a control CAT contacted the research team with questions about the report and these were answered.

CAT process assessments. Each participating CAT member completed questionnaire measures of their views of the empirically based prevention framework, CAT functioning (in general and vis-à-vis implementing framework-related activities), leadership, and community supports and obstacles to framework activities. These assessments occurred on three occasions:

pre-action planning (prior to briefings on 2006 CA results), post-action planning (after briefings on 2006 CA results and CAPs were to have been made), and follow-up (prior to the 2008 CA).

Measures

Secretive problems. Assessed in the 2006 and 2008 CAs, each secretive problem was operationalized dichotomously; scores were coded 1/0 (problem present/absent) based on thresholds denoting clinical significance. All outcomes were considered primary outcomes.

Hazardous drinking. Hazardous drinking was measured with the Alcohol Use Disorders Identification Test (AUDIT; Allen, Litten, Fertig, & Babor, 1997). The AUDIT is a 10-item self-report measure of alcohol dependence created by the World Health Organization (WHO). It has well established sensitivity and specificity against clinical assessments (Reinert & Allen, 2002; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Per Rumpf, Hampke, Meyer, and John (2002), individuals who scored ≥ 8 were classified as above the cutoff for hazardous drinking.

Controlled prescription drug misuse. Participants were completed a checklist of commonly abused controlled prescription medications (e.g., amphetamines and codeine; Heyman, Slep, & Nelson, 2011). For each drug checked, the respondent was asked the frequency of use (a) when s/he did not have a prescription and (b) at a dosage greater than prescribed. Prescription drug misuse was scored as present based on any positive response.

Suicidality. Suicidality (either serious ideation or attempts) during the year prior to study participation was assessed with four items from the Youth Risk Behavior Survey that have been used in nationally representative studies (Brener et al. 2002; Witte et al., 2008). Individuals were classified as having significant suicidal ideation if they reported that they had (a) seriously considered attempting suicide rarely, sometimes, or frequently, (b) had thoughts of ending their lives sometimes or frequently, or (c) had planned a suicide. Suicidal behavior was indicated by a non-zero response to a single item reflecting the frequency of actual suicide attempts.

Clinically significant physical and emotional intimate partner violence and child abuse. The Family Maltreatment measure (FM; Heyman, Snarr, Slep, Baucom, & Linkh, 2018) was used to measure physical and emotional aggression that meets military and civilian thresholds for clinically significant intimate partner violence (CS-IPV) and child abuse (CS-child abuse) — non-accidental acts that that cause harm (e.g., injury, fear) or have high potential for harm (e.g., burning, using a weapon, choking). The FM has demonstrated content, concurrent, convergent, and response process validity (Heyman et al., 2018).

The FM has four modules: (1) Physical IPV perpetration and victimization, (2) emotional IPV victimization, (3) physical child abuse perpetration, and (4) emotional child abuse perpetration. Each asks about (a) 12-month occurrence of acts in specific categories — partner emotional aggression (9 items) and physical aggression (14 items) and child emotional aggression (9 items) and physical aggression (18 items); and (b) impacts of the acts (e.g., injury, fear, and depression). Partner physical aggression items measure perpetration and victimization. Partner emotional aggression items are limited to victimization. All child aggression items inquired about parental self-reported perpetration. To be classified as abusive by Department of Defense criteria (which have been adopted by both the Diagnostic and Statistical Manual, 5th Edition and the International Classification of Diseases, 11th Edition), individuals needed to report (a) one or more acts of physical or emotional aggression and (b) significant harm or a high potential for harm. Partner physical abuse perpetration and victimization were combined into a single variable indicating abuse in the household.

Cumulative risk. We measured additive risk across 22 risk and protective factors, following Sameroff, Seifer, Baldwin, and Baldwin (1993). The risk and protective factors are grouped in four domains at multiple levels of the individual's ecology: individual (economic stress, physical health, personal coping, spirituality/religiosity, depressive symptoms, and

personal deployment preparedness), family (parent-child relationship satisfaction, intimate relationship satisfaction, family coping, career support from a significant other, and partner readiness for deployment), workplace (workgroup cohesion, workplace relationship satisfaction, and satisfaction with the Air Force), and broader community (community safety, satisfaction with community resources, community cohesion, support from neighbors, support from formal agencies, social support, community support for youth, and support from Air Force leadership). Given the number of measures involved, details are presented in the On-line Supplement. Each risk and protective factor was dichotomously scored; individuals who fell into the least adaptive ¼ of each variable's distribution (i.e., the top 25% for risk factors; the bottom 25% for protective factors) received a 1; the remaining ¾ received a 0. The cumulative risk index was calculated by summing across these 22 dichotomous scores, and could therefore range from 0 to 22.

CAT process. Four questionnaires were used to create composite measures of process (see descriptions below). The on-line supplement provides expanded descriptions, item examples, and psychometrics for the scales: the (a) Prevention Programming and Implementation Questionnaire (PPIQ); (b) the Community Readiness Factors Questionnaire (CRFQ); (c) Efficacy and Outcome Expectancy Questionnaire (EOEQ); and (d) the Community Action Plan Questionnaire (CAPQ). CAT process variables were secondary outcomes.

***CAT process scores used for analysis*.** Based on conceptual and empirical criteria (i.e., correlations ≥ *.50* among the process variables), we calculated four multi-scale composite scores by first standardizing and then averaging constituent subscales' scores. *Orientation toward empirical prevention* comprised the PPIQ use of data, criteria influence, and risk and protective factors framework use subscales' scores. *Community support* comprised the CRFQ community support for prevention, wing leadership support for prevention, effective wing leadership, and community/CAT resistance to change (reversed) subscales' scores. *CAP development* comprised

the CRFQ community action goal development, action plan development, and action plan specificity subscale' scores. *Barriers to implementation* comprised the CRFQ barriers to implementation and EOEQ positive program related expectancy subscales' scores. The final set of eight baseline (i.e., measured at the pre-action planning assessment) CAT process variables used in our analyses included the above four composite variables and the PPIQ *attitude toward community mental health data*, CRFQ *CAT collaboration*, EOEQ *present efficacy, and* EOEQ *program related efficacy* scores.

Change in CAT process was also operationalized for each of the eight above variables via linear slope scores directly calculated across the pre-action planning, post-action planning, and follow-up assessments (coded 1, 2, and 3, respectively) at the base level for each variable. In the case of composite variables, the slopes were calculated individually for each constituent variable, then standardized and averaged. Reverse scoring was employed as described in the construction of baseline composite scores. For the two variables not assessed at follow-up (both belonging to the orientation toward empirical prevention composite), slopes were equivalent to change scores.

Analytic Strategy

A priori hypotheses were tested with statistical models were estimated at Level 1 (individuals) and Level 2 (bases) in the context of multilevel analysis with robust estimation in Mplus (Muthén, & Muthén, 1998-2017) and at Level 2 with ordinary statistical tests (e.g., *t*-tests, chi-square). Individual outcomes were analyzed in the AD dataset (n = 33,018). Family outcomes were analyzed in the family dataset (n = 35,297). CS-IPV was analyzed in the n = 34,314 participants with intimate partners. Child abuse was analyzed in the n = 22,755 participants with children. Multiple imputation was employed to estimate missing data, using IVEware (Raghunathan, Solenberger, & Van Hoewyk, 2002). For each of the above three data

sets, five datasets were imputed and analyzed separately, their results combined according to Rubin's rules (Schafer & Graham, 2002).

Special challenges. Although there were tens of thousands of participants in the study, the unit of randomization was the base, of which there were 24. Accordingly, we intended to follow the "analyze as you randomize" maxim to. Standard recommendations for multilevel analysis suggest a minimum of 30 Level 2 units (Raudenbush & Bryk, 2002). Perhaps unsurprisingly then, with so few Level 2 units (i.e., bases), statistical estimation proved challenging. We used several alternative statistical techniques to overcome these limitations to the extent possible while maintaining inferential and descriptive integrity.

Baseline differences between groups. In the AD and family datasets, each of 10 demographic variables were examined for Time 1 group differences that might confound intervention effects. This was accomplished via multilevel models that regressed each of these variables on group. Group differences were modeled at Level 2. However, given low power, we conducted a second round of screening based on effect sizes. Cohen's *d*s and *OR*s were calculated for continuous and categorical variables, respectively. The CAT process variables were compared in the CAT process data set via independent samples *t*-tests, with accompanying *d*s.

Main effects of intervention on secretive problems and cumulative risk. The intended analytic strategy was to use multilevel analysis to model 2006 to 2008 base level changes in secretive problems and cumulative risk (i.e., random slopes at Level 2) as a function of group (a Level-2 covariate). However, although descriptively secretive problems seemed to show varying degrees of 2006 to 2008 changes from base-to-base (Level 2), the degree of variability among the bases was not statistically significant for secretive problems or cumulative risk in multilevel analyses. Thus, alternative strategies were employed: "simple Level-2" and Level-1 analyses.

Simple Level-2 analysis. To measure the extent to which each base exhibited 2006 to 2008 changes in secretive problems and cumulative risk, logistic regression models were estimated for each base. Each secretive problem and cumulative risk were regressed on time. The sign of and significance for the time regression coefficient (*B*) was recorded for each base, giving an indication of whether the base exhibited reliable decreases in secretive problem or cumulative risk. Bases with negative *B*s and *p*s < .05 were coded as having reliably decreased; all other cases were coded as not having reliably decreased. This reliable-decrease categorization was then analyzed in relation to group assignment to determine whether secretive problem and cumulative risk rates showed greater evidence of reliable decreases in the NORTH STAR than the control condition. The dependence of reliable decreases on group was tested with an adjusted $\chi 2$ (N/N-1) that is thought to be more accurate than either the traditional Pearson's $\chi 2$ or Fisher's exact test when expected frequencies are low, as they are in the present data (Howell, 2012). The corresponding effect sizes were quantified by absolute risk reductions (ARR). The five Time 1 CAT covariates on which the groups descriptively differed could not be included in these models given the small sample size and the use of a statistic that does not allow for covariates.

Level-1 analysis. Given the lack of Level-2 (i.e., base) variability in outcome change over time, we also conducted multilevel analyses with intervention effects estimated at Level-1 (i.e., person). Each outcome was simultaneously regressed on time (cohorts treated as independent groups, given the repeated cross-sectional design), group, Time × Group, and the five control variables noted below, all treated as Level-1 covariates in models that accounted for clustering within base. Level-2 variation in the outcomes was also allowed. The Time × Group term (i.e., Does change over time in the secretive problem depend on group?) reflects the main effects of intervention, adjusted for covariates. In a parallel set of analyses to those detailed above, the *B*s for 2006 to 2008 change in secretive problems rates and cumulative risk were

quantitatively compared in NORTH STAR versus control bases (Table 1). Independent samples *t*-tests and Cohen's *ds* were computed comparing mean 2006 to 2008 change *B*s by group.

Moderation of intervention effects by individual background and CAT process variables. We evaluated whether intervention effects on each outcome were moderated by (a) background factors (gender, pay grade [tested categorically across its five levels]), (b) baseline levels of each of the eight CAT process variables, and (c) change in each of the CAT process variables. These effects were tested via multilevel models at Level 1 (Level-2 variation in the outcomes was allowed as above), with each outcome simultaneously regressed on time (2006 and 2008 cohorts treated as independent groups), group, moderator, Time × Group, Time × Moderator, Group × Moderator, Time × Group × Moderator, and five control variables. Continuous predictors were mean centered and dichotomous variables (time and group) were centered with effects coding (-1 and 1). Significant interactions were decomposed via simple slopes plotted at +/- 1 *SD*s on the moderator (Preacher, Curran, & Bauer; 2006). To control for Type I error, Bonferroni corrections were employed with familywise alpha set to .05. For the five moderation tests for background factors conducted for each outcome, the adjusted criterion *p*-value was .010. The adjusted criterion *p*-value for the eight moderation tests per outcome for CAT process variables was .006 in both the CAT process baseline and change analyses.

Results

Baseline Differences between Groups

As shown in Supplement Table S2, none of the multilevel models found significant demographic differences between groups; the largest group difference effect sizes (d = .11 and odds ratio [*OR*] = .84), also indicated differences were negligible. CAT process variables were compared at Time 1. Only program-related efficacy differed between groups (t = -2.07, p =.039). However, five of the *d*s > .30, and thus were selected as covariates in outcome analyses.

Main Effects of Intervention on Secretive Problems and Cumulative Risk

Simple Level-2 analysis. NORTH STAR produced marginally significant ($p < .10$) preventive effects for hazardous drinking and cumulative risk. Sixty-seven percent of the NORTH STAR bases, compared with 33% of control bases, experienced significant decreases in hazardous drinking rates, adjusted $\chi_2(1) = 2.78$, $p = .095$. Additionally, 42% of the NORTH STAR bases, compared with 8% of control bases, had reliable declines in cumulative risk, adjusted $\chi_2(1) = 3.71$, $p = .054$. Few other reliable changes were found in either group (Table 1).

In analyses of *B*s for 2006 to 2008 change in secretive problems rates and cumulative risk, the means did not reliably differ between groups. However, numerically greater decreases in secretive problems were generally found in NORTH STAR bases compared with control bases. Effect sizes (Cohen's *d*) favoring NORTH STAR (i.e., greater decreases in secretive problem rates; 7 of 8 comparisons) ranged from -.06 to -.54, indicating negligibly small to medium size effects. In the remaining case control bases demonstrated larger 2006 to 2008 decreases in physical CS child abuse, $d = .06$.

Level-1 analysis. None of the Time × Group effects were significant.

Moderation of Intervention Effects

Moderation by background factors. There was no evidence of individual background factor moderation effects.

Moderation by baseline CAT process variables. CAT process variables significantly moderated intervention effects for suicidality (Supplement Table S3), emotional CS-IPV (Supplement Table S4), and physical CS child abuse (Supplement Table S5).

Suicidality. A significant Time × Group × Barriers to Implementation interaction was obtained. When barriers to implementation were low, the NORTH STAR group exhibited a significant decrease in suicidality (simple slope (*B*) = -0.40, *SE* = 0.07, $p < .001$, 95% CI: -0.55,

-0.26), whereas the control group did not exhibit reliable change (*B* = -0.07, *SE* = 0.05, *p* = .126, 95% CI: -0.17, 0.02). When barriers to implementation were high, neither the NORTH STAR (*B* = 0.01, *SE* = 0.06, *p* = .919, 95% CI: -0.12, 0.13) nor the control (*B* = -0.06, *SE* = 0.05, *p* = .234, 95% CI: -0.16, 0.04) groups exhibited reliable change in suicidality.

Emotional CS-IPV. A significant Time × Group × Barriers to Implementation interaction was also obtained for emotional CS-IPV. Similar to suicidality, when barriers to implementation were low, the NORTH STAR group exhibited a significant decrease in emotional CS-IPV (*B* = -0.19, *SE* = 0.05, *p* < *.001*, 95% CI: -0.28, -0.09), whereas the control group did not exhibit reliable change (*B* = 0.03, *SE* = 0.04, *p* = .404, 95% CI: -0.04, 0.10). When barriers to implementation were high, neither the NORTH STAR (*B* = 0.04, *SE* = 0.04, *p* = .316, 95% CI: -0.04, 0.11) nor the control (*B* = -0.05, *SE* = 0.08, *p* = .516, 95% CI: -0.22, 0.11) groups exhibited reliable change in emotional CS-IPV.

Physical CS-child abuse. A significant Time × Group × CAT Collaboration interaction was obtained. Decomposition of this interaction indicated that none of the constituent simple slopes were statistically significant. At high levels of CAT collaboration, the simple slope for NORTH STAR was positive (*B* = 0.12, *SE* = 0.08, *p* = .137, 95% CI: -0.04, 0.28) and the simple slope for control bases was negative (*B* = -0.06, *SE* = 0.04, *p* = .127, 95% CI: -0.14, 0.02). At low levels of CAT collaboration, the simple slope for NORTH STAR was negative (*B* = -0.08, *SE* = 0.05, *p* = .090, 95% CI: -0.18, 0.01) and the simple slope for control bases was positive (*B* = 0.06, *SE* = 0.05, *p* = .265, 95% CI: -0.04, 0.15).

Moderation by CAT process change variables. CAT process change across time significantly moderated intervention effects for suicidality (Supplement Table S6) and physical CS child abuse (Supplement Table S7).

Suicidality. A significant Time × Group × Community Support Change interaction was

obtained. With decreasing community support, the NORTH STAR group exhibited a significant decrease in suicidality (*B* = -0.17, *SE* = 0.04, *p* < *.001*, 95% CI: -0.25, -0.10), whereas the control group did not exhibit reliable change (*B* = -0.01, *SE* = 0.04, *p* = .855, 95% CI: -0.09, 0.08). With increasing community support, the pattern was reversed: the control group exhibited a significant decrease in suicidality (*B* = -0.15, *SE* = 0.04, *p* = .001, 95% CI: -0.23, -0.06), whereas the NORTH STAR group did not exhibit reliable change (*B* = -0.05, *SE* = 0.07, *p* = .447, 95% CI: -0.18, 0.08).

Physical CS-Child Abuse. A significant Time × Group × CAT Collaboration Change interaction was obtained. With increasing CAT collaboration, the NORTH STAR group exhibited a significant decrease in physical CS-child abuse (*B* = -0.09, *SE* = 0.04, *p* = .035, 95% CI: -0.18, -0.01), whereas the control group did not exhibit reliable change (*B* = 0.02, *SE* = 0.02, *p* = .298, 95% CI: -0.02, 0.07). With decreasing CAT collaboration, neither the control (*B* = -0.09, *SE* = 0.07, *p* = .176, 95% CI: -0.23, 0.04) nor NORTH STAR (*B* = 0.10, *SE* = 0.06, *p* = .117, 95% CI: -0.03, 0.22) groups exhibited statistically significant change in physical CS-child abuse.

Discussion

NORTH STAR marginally reduced rates of hazardous drinking and cumulative risk in AF communities and significantly reduced rates of several other secretive problems when the local environment for prevention was supportive. There were no instances where NORTH STAR had iatrogenic effects, even when interactions with process variables were examined. Regarding the modest base-level findings, several methodological issues should be highlighted. First, the sample size of *N* = 24 communities, despite constituting one-third of the AF, clearly limited power. Second, the change was tested in population prevalences, rather than in individual functioning; this is a stringent bar for a prevention effort to be held to, and even with this bar,

some notable effects were detected. Third, because prevalences of clinically significant problems were our focus, measurement was binary. Measures such as these, although providing exactly the information that policy decisions are based on, are less sensitive to change than are continuous measures. Furthermore, because the distributions are inherently skewed, even greater power is required to sensitively detect effects. Consistent with this, hazardous drinking (among the most balanced of the distributions of outcome variables) and cumulative risk (an aggregate, continuous variable) were the outcomes demonstrating the unmoderated base-level marginally significant effects. Finally, fully one-third of the intervention bases did not implement any prevention strategies. The intent-to-treat analyses we conducted are appropriate, but provide a conservative estimate of the effects of the intervention under ideal conditions. (And more sophisticated approaches than intent-to-treat, such as Complier Adjusted Causal Effects, Jo & Muthén, 2001, are not appropriate with such small *n*s.) When analyses were conducted at the individual level and accounting for covariates and clustering, NORTH STAR resulted in reliable reductions in suicidality, child physical abuse and partner emotional abuse when the implementation environment was supportive, even if the environment became less supportive over time. All told, the results of this RCT suggest that NORTH STAR is a promising approach to reducing hidden behavioral health problems such as suicide and family maltreatment.

NORTH STAR is innovative in a number of ways. First, it offers an integrated approach to behavioral health promotion by targeting RPFs shared among many outcomes. Second, within the context of a focal community, it can be implemented with relatively low costs. Third, it is a population-level prevention approach. Thus, it is a framework that complements traditional emotional or psychoeducational prevention formats and policy-based prevention initiatives, offering stakeholders a more comprehensive prevention strategy.

NORTH STAR — because it is a framework and strategy, rather than a specific set of programs — is inherently flexible. As evidence accumulates and empirically-supported light-touch prevention programs aimed at the included RPFs evolve and innovations are made, the menu of prevention choices can be modified. In addition, an RPF not targeted accumulates evidence that it is more powerful than one originally targeted, the framework can incorporate it. In this way, NORTH STAR is more sustainable than many fixed programs because it is flexible and adaptable to improvements in both the assessment and intervention components.

Relatively few other prevention frameworks have sought to affect population prevalences of emotional or behavioral health problems. Two such efforts include Communities that Care (Hawkins & Catalano, 2002) and Triple P (Sanders, Turner, & Markie-Dadds, 2002). Communities that Care, the inspiration for NORTH STAR, targets a different array of problems within a different population (i.e., school-aged children). Triple P is a multi-level parenting program that has consistent content but is delivered at different levels of intensity. Both have been shown to improve public health (Hawkins et al., 2012; Prinz et al., 2009), supporting the general approach that both they and NORTH STAR embody. Given the nature of such approaches, even initial tests are closer to dissemination trials than traditional, tightly controlled efficacy trials, where all aspects of implementation are under the control of the investigator. In other words, RCTs of community prevention approaches necessarily emphasize external validity while maintaining acceptable internal validity, whereas traditional RCTs emphasize internal validity while maintaining acceptable external validity.

NORTH STAR would likely produce greater improvements in outcomes if more consistent implementation could be achieved. It could be that working with entire bases as the unit of implementation was not optimal because the base population is diverse and stakeholders on the prevention committees often had primary allegiances to their specific duties and

supervisors. A subsequent trial of NORTH STAR is implementing action plans in military work groups and these efforts are overseen by the unit commanders. On the one hand, these commanders have no expertise in prevention planning. On the other, their motivation to support the functioning of their members is high. It could be this narrower focus with more invested implementers will result in stronger impacts.

The current trial is not without its limitations. As detailed earlier, the study had limited power, despite including a large proportion of the Air Force overall. Second, measures were limited to self-report and all the biases inherent in that. Third, because the data were repeated cross-sectional, rather than longitudinal within individual, we can only speak to population-level change rather than change within person. Fourth, the implementation challenges within the NORTH STAR condition suggest that despite the emphasis placed on making the framework easy to use and selecting easy to implement activities, taking population-level action is inherently challenging and requires significant support to take hold. Fifth, the impact of a framework is inherently dependent on the effectiveness of the empirically-supported interventions that are selected and implemented within it. When the effectiveness of available interventions is limited, it necessarily impacts the potential effectiveness of NORTH STAR.

Despite these limitations, NORTH STAR has promise to complement existing prevention efforts that tend to be problem-specific (e.g., reducing hazardous drinking in junior enlisted Airmen or preventing child abuse in at-risk parents). NORTH STAR appears to reduce clinically-significant problems without targeting them directly. To reduce secretive problems, an approach that targets shared RPFs instead of the outcomes themselves, might help improve health in ways that problem-specific programs cannot. In addition, NORTH STAR has a flexibility to incorporate advances and target emerging needs, boosting sustainability. Taken

together, there is potential for NORTH STAR, and other frameworks like it, to help promote empirically-supported interventions in large systems to decrease problems and improve health.

Compliance with Ethical Standards

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Conflict of Interest

All authors declare that they have no conflict of interest.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained for all individual participants included in the study.

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Table 1

Simple Level-2 Analyses of Intervention Effects

	Number of Significant 2006 to 2008 Decreases[a]				Mean (*SD*) Change by Group 2006 to 2008[b]			
Dependent Variable	NORTH STAR	Control	p[c]	ARR (95% CI)	NORTH STAR	Control	p[d]	*d* (95% CI)
Hazardous drinking	8	4	.095	0.33 (-0.04, 0.71)	-.18 (.17)	-.14 (.16)	.529	-0.26 (-1.11, 0.59)
Suicidality	0	0	1	-	-.09 (.16)	-.07 (.10)	.694	-0.16 (-1.01, 0.69)
Prescription drug misuse	0	0	1	-	-.02 (.13)	.03 (.24)	.586	-0.23 (-1.08, 0.62)
Physical CS-IPV	0	0	1	-	-.01 (.18)	.06 (.15)	.316	-0.42 (-1.28, 0.44)
Emotional CS-IPV	0	0	1	-	-.004 (.11)	.003 (.14)	.887	-0.06 (-0.91, 0.79)
Physical CS child abuse	0	1	.297	-0.52 (-0.56, -0.48)	-.01 (.19)	-.02 (.14)	.887	0.06 (-0.79, 0.91)
Emotional CS child abuse	0	0	1	-	-.15 (.13)	-.06 (.17)	.200	-0.54 (-1.40, 0.32)
Cumulative risk	5	1	.054	0.44 (0.38, 0.51)	-.14 (.54)	-.02 (.35)	.540	-0.25 (-1.10, 0.60)

Note. ARR = absolute risk reduction; CS = clinically significant; IPV = intimate partner violence; [a] 12 bases in each condition; [b] figures are group mean regression coefficients (*B*) from Level-1 regression of each dependent variable on time; [c] *p*-values correspond to adjusted (N/N-1) χ^2; [d] *p*-values correspond to independent samples *t*-tests.

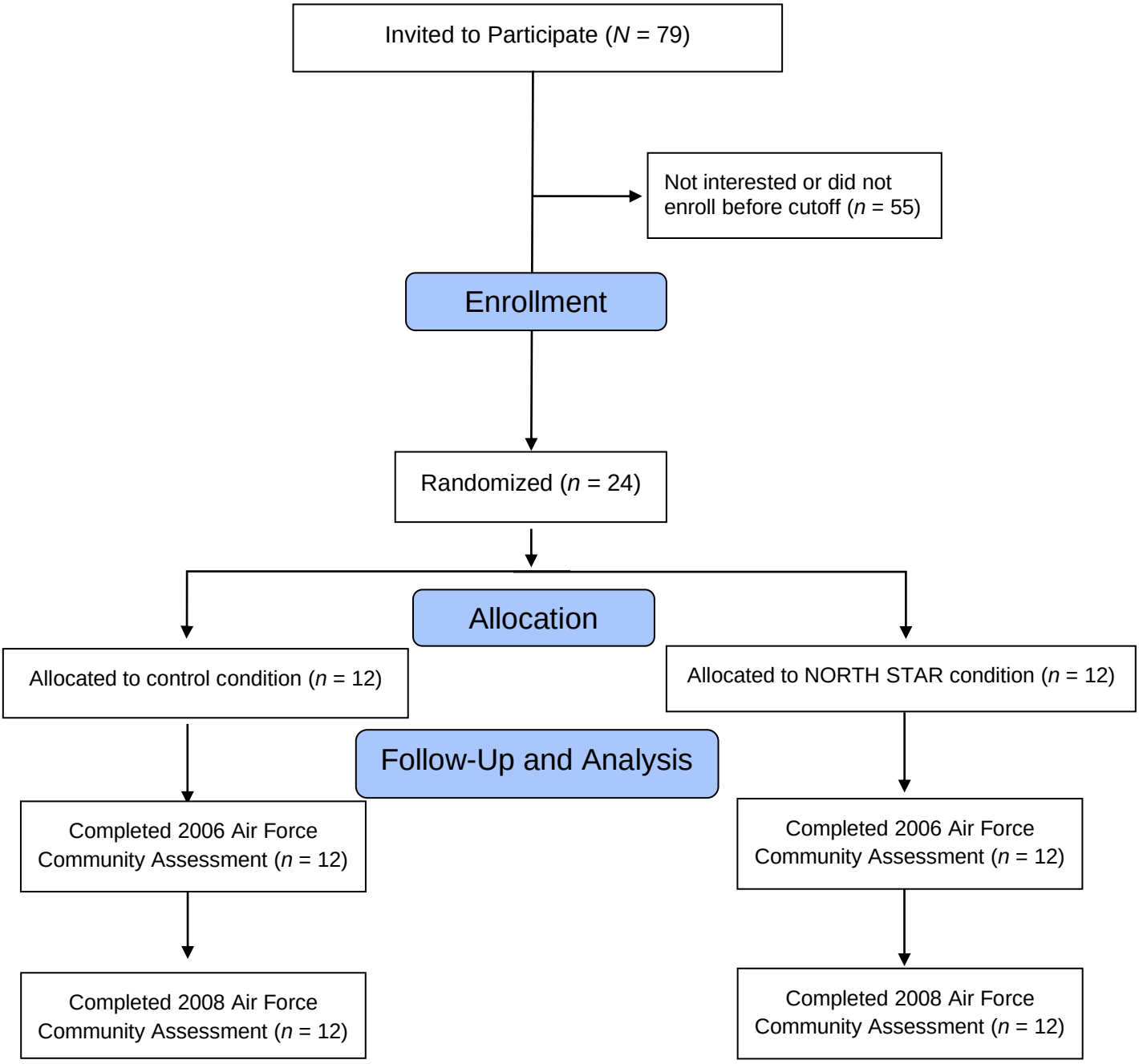

Figure 1. CONSORT diagram of the NORTH STAR RCT

Appendix E

Curricula vitae

The PIs' curricula vitae are included in this appendix, beginning on the next page.

Curriculum Vitae
Amy M. Smith Slep

Educational History

1. SUNY Stony Brook, Stony Brook, NY

Area:	Clinical Psychology	
Degree:	Ph.D.	1995
	M.A.	1993

Dissertation: Maternal Attribution and Overreactive Parenting: An Experimental Analysis

2. University of Delaware, Newark, DE

Major:	Psychology	
Degree:	B.A. in Psychology	1987
Honors:	Dean's List	1984-1987
	Honors' Certificate	1985

Professional Positions

1.	Professor, New York University	2011-
2.	Research Professor, Stony Brook University	2010-2011
3.	Research Associate Professor, Stony Brook University	2003-2010
4.	Research Assistant Professor, Stony Brook University	1998-2002
5.	Research Scientist. Stony Brook Dating Violence Prevention Grant (NIMH grant #1R01MH-47801)	1997-1998
6.	Post-Doctoral Research Associate. Stony Brook Dating	

Violence Prevention Grant (NIMH grant #1R01MH-47801) 1995-1997

Classroom Teaching Experience

1. Instructor, SUNY Stony Brook. 1996
   Abnormal Child Psychology
2. Graduate Instructor, SUNY Stony Brook 1991-1994
   Abnormal Psychology
   Behavior Modification (twice)
   Introduction to Psychology
   (Received Excellence in Teaching Award, Department of Psychology, 1995)
3. Graduate Teaching Assistant, SUNY Stony Brook 1989-1993
4. Undergraduate Teaching Assistant, University of Delaware 1987

Clinical Experience

1. NYS License 1998
2. Clinical Internship, Village for Families and Children 1994-1995
3. Parents Anonymous 1991-1993
4. Psychiatric Technician, Middlesex Memorial Hospital 1987-1989

Publications

In Press

2019

Bulling, L. J., Baucom, K. J., Heyman, R. E., Slep, A. M. S., Mitnick, D. M., & Lorber, M. F. (2019). Predicting program retention in a flexibly-delivered relationship education program for low-income, unmarried parents. *Journal of Family Social Work*, 1-23.

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Malik, J., Heyman, R. E., & Slep, A. M. S. (2019). Emotional flooding in response to negative affect in couple conflicts: individual differences and correlates. *Journal of Family Psychology.*

2018

Beach, S. R., Foran, H. M., Heyman, R. E., Slep, A. M. S., Cordaro Jr, A. R., Wamboldt, M. Z., Reiss, D. & Kaslow, N. J. Relational Processes. In The Oxford Handbook of Relationship Science and Couple Interventions.

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Balderrama-Durbin, C., Snyder, D., Cigrang, J., Talcott, G. W., Tatum, J., Baker, M., Cassidy, D., Sonnek, S., Slep, A., & Heyman, R. (2013). Combat disclosure in intimate relationships: Mediating the impact of partner support on posttraumatic stress. *Journal of Family Psychology, 27,* 560-568.

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Grant Funding

PHS Funding

"Research on the Efficacy and Feasibility of Essentials for Parenting Toddlers and Preschoolers"
Principle Investigator: Amy M. Smith Slep
Agency: CDC, Westat
Subcontract Direct costs: $90,492
Type: Contract (200-2014-59973)
Period: 09/30/14-09/29/16
Data Analysis Supplement: Approximately $56,000, period 9/2016-8/2017

"Targeting Corrosive Couple Conflict and Parent-Child Coercion to Impact Health Behaviors & Regimen Adherence"
Agency: NIH
Direct Costs: $1,500,000
Type: Cooperative Agreement (1UH2DE025980-01), plus supplement
Period: Sept 01, 2015 – July 1, 2018
Supplement: Minority Training, approximately $60,000
Supplement for pilot study: Approximately $20,000

"Does coercive process play a role in adolescent dating violence?"
Principle Investigators: Michael F. Lorber, Amy M. Smith Slep, and Richard E. Heyman
Agency: NICHD
Total costs: $427,457
Type: Grant (R21HD077345-01A1)
Period: 7/1/2014-6/30/2016

"Planning Parental/Motivational Interventions to Prevent Early Childhood Caries"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: NIDCR
Direct costs: $322,000
Type: Grant (1R34DE022269-01)
Period: 09/23/2011 – 08/31/2013

"Impact of Family Functioning and Violence on Adults' and Children's Oral Health"
Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: NIDCR
Total Costs (Parent grant + ARRA supplement) $439,900 + $570,520
Type: Grant (1R21DE01953701A1)
Period: 08/08/09-7/31/11

""Couple CARE for Parents': A Dyadic Approach to Preventing IPV'
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: Centers for Disease Control
Total Costs: $1,999,998
Type: Cooperative Agreement (U49/CE001246)
Period: 9/30/07 – 9/29/12

" 'Couple CARE for Parents' for Low Income, Unwed Families"
Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: Administration for Children and Families
Total Costs:$3,054,579
Type: Grant (90FE0131/01)
Period: 9/30/06 – 9/29/11

"Risk and Protective Factors for Partner Abuse, Child Maltreatment, & Suicidality"
Principal Investigator: Amy M. Smith Slep, Ph.D.
Agency: CDC
Direct Costs: $ 577,330
Type: Grant (5R49CE00091902)
Period: 9/30/06 – 9/29/09

"What Facets of Family Violence Affect Child Functioning?"
Principal Investigator: Amy M. Smith Slep, Ph.D.
Agency: NICHD
Direct Costs: $ 1,372,180
Type: Grant (R01 HD46901-01)
Period: 5/01/04 – 4/30/09

"Emotional Regulation and Intimate Violence"
Principal Investigator: Amy M. Smith Slep, Ph.D.
Agency: NIMH
Direct Costs: $375,000
Type: Grant (1 R01 MH67043-01)
Period: 2/01/03-1/31/07

"Models of Partner and Parent Aggression,"
Principal Investigator: K. Daniel O'Leary, Ph.D. (Dr. Slep is Co-PI and primary author)
Agency: NIMH
Direct Costs $1,684,510
Type: Grant R01MH57985
Period: 12/15/98-11/30/03

"Risk for Partner Abuse: Proximal and Distal Factors."
Principal Investigator: Richard E. Heyman, Ph.D. (Dr. Slep is Co-PI.)
Agency: Centers for Disease Control and Prevention
Direct Costs: $459,709
Type: Grant (R01/CCR 2 18554-01)
Period: 9/1/00 – 8/31/03

"Anger Escalation and De-Escalation in Aggressive Men"
Principal Investigator: Richard E. Heyman, Ph.D. (Dr. Slep is Co-PI.)
Agency: NIMH
Direct Costs: $349,997
Type: Grant R01MH57779
Period: 6/1/98-1/31/01

Other Federal Funding (All have been approved for funding or funded)

”Lesbian, Gay, and Bisexual Couples in the Military: A Post-DADT Examination of Relationship Health, Perceived Community Acceptance, and Mission Readiness”
Principal Investigators: Cigrang, J (Lead), Slep, A., Heyman, R.
Period: 07/01/2018-06/30/21
Agency: Department of Defense
Total Costs: $1,053,094.00 (NYU Sub: $654,314)
Type: Cooperative Agreement (W81XWH-18-2-0027)

“School Support, School Connectedness, and the Educational Outcomes of Military-Connected Students: An Exploratory Study of Student Mobility”
Principal Investigator: Renee Spencer (Boston University)
Co-Principal Investigators: A. Slep, T. Cavell, C. Herrara
Period: 07/01/2018-06/30/2022
Agency: Institute for Educational Sciences
Total Costs: $1,399,914 (NYU Sub:)
Type: Grant (R305A180142)

“Longitudinal Cohort Study of Interpersonal Violence Among College-Aged Women and Men: Planning Phase”
Principal Investigators: Chriball, Fischer, Slep, and Heyman (Westat is lead entity)
Period: 1/9/17-12/31/18
Agency: National Institute of Justice
Total Costs: approximately $300,000 (NYU Subcontract)
Type: Contract (GMS Award 2016-MU-MU-K074)

“Up-armoring” at-risk military couples: A prospective study of committed romantic relationships in transition to their first permanent duty station
Agency: DoD
Principal Investigator: (PI: Dr. Jeff Cigrang, Wright State U.; Subcontract PIs: Slep & Heyman)
Period: To Be Assigned
Total Costs: $368,853 (Year1 Total)
Type: Grant (To Be Assigned)

“Improving Caseload Management in FAP and Mental Health: Phase 2”
Principal Investigators: Amy M. Smith Slep and Richard. E. Heyman
Agency: USDA/USAF
Period: 9/1/16-8/31/17
Total Costs: $212,000
Type: Contract (2012-39574-20264)

“Army Family Advocacy Program Incident Determination Committee Testing and Evaluation”
Agency: USDA/ US Army
Principal Investigators: Amy M. Smith Slep and Richard. E. Heyman
Period: 9/30/15-9/29/16
Total Costs: $1.8M (Year1)
Type: Cooperative Agreement (2015-48783-24394)

"Improving Caseload Management in FAP and Mental Health: Phase 1"
Principal Investigators: Amy M. Smith Slep and Richard. E. Heyman
Agency: USDA/USAF
Period: 9/1/15-8/31/16
Total Costs: $145,666
Type: Contract

"Relationship Processes in the Development of Teen Dating Violence"
Principal Investigators: Michael Lorber, Amy M. Smith Slep and Richard. E. Heyman
Period: 1/1/15-12/31/17
Agency: National Institute of Justice
Total Costs: $800,000
Type: Grant (2014-VA-CX-0066)

"Developing a Model for Delivering School-Based Mentoring to Students in Military Families"
Principal Investigators: Timothy Cavell (Amy Slep at NYU)
Agency: IES/University of Arkansas
Total Costs: $1,003,000
Type: Grant with subcontract (R305A140285)
Period: 9/1/2014-8/31-2019

"Child and Domestic Abuse Severity Scales Scalability Project"
Principal Investigators: Amy M. Smith Slep and Richard. E. Heyman
Agency: USDA/Pennsylvania State University/DoD FAP
Total Costs: $436,000
Type: Contract (2013-39578-21519)
Period: 9/1/2013-8/31-2014

"Developing the Next Generation of Family Maltreatment Prevention Training"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: USDA/Kansas State University/US AF FAP
Total Costs $91,534
Type: Contract (S14013)
Period: 1/1/13-12/31/13

"Unified Strategy of Action for Airman Resilience and Maintenance of Operational Readiness"
Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: USDA/Kansas State University/US AF A1S1
Total Costs $575,000
Type: Contract (2010-48696-21892)
Period: 06/01/12-8/31/13

"AF Dissemination of the New DoD Severity Scale"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: USDA/Kansas State University/US AF FAP
Total Costs $180,000
Type: Contract (S3029)
Period: 10/01/12-9/30/14

"Grants to Reduce Domestic Violence Against Women Prevention and Response Project"
Principle Investigator: Amy Hammock (Subcontract-PI: Slep)
Agency: Department of Justice, Office on Violence Against Women
Subcontract Direct Costs" $60,000
Type: Subcontract (to be assigned)
Period: 10/01/12-9/30/15

"Grants to Reduce Domestic Violence Against Women Prevention and Response Project"
Principle Investigator: Tamara DelVecchio (Subcontract-PI: Slep)
Agency: Department of Justice, Office on Violence Against Women
Subcontract Direct Costs" $78,000
Type: Grant (DB#2328)
Period: 10/01/11-9/30/14

"Barriers and Attractors to Mental Health Help-Seeking in the U.S. Air Force"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: USDA/Kansas State University/US AF FAP
Total Costs $180,000
Type: Contract (2011-48740-31167)
Period: 10/01/11-9/30/13

"Individual and Relationship Factors Affecting Marriage Quality and Stability Across the Deployment Cycle: Psychological Health and Well-Being for Military Personnel and Families"
Role: Heyman & Slep, Co-Investigators; PI: Lt. Col. Jeff Cigrang
Agency: Congressionally Directed Med. Research Programs (DoD)
Direct Costs: $481,000
Type: Grant (D61_I_10 J5_100)
Period: 10/01/10-09/30/2012

"Revising the DoD FAP Severity Scales"
Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: USDA/Kansas State University/ USAF FAP
Total Costs $63,000
Type: Contract (2009-48353-06045)
Period: 10/01/11-9/30/12

"Developing a Family Advocacy Program Desk Reference Guide for the Marine Corps Family Advocacy Program"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: United States Marines
Total costs: $83,362.12
Type: Grant (H0111-R-0001)
Period: 9/1/2011-8/31/2016

"Randomized Controlled Trial to Improve the Effectiveness of the NORTH STAR Prevention Framework by Embedding Evidence-Based Prevention Within the Military Unit"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: Department of Defense

Total costs: $3,453,998
Type: Grant (PR101075 (W81XWH-11-1-0778))
Period: 9/30/2011-9/29/2016

“Unlocking the Power of the Military Social Network”
Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: DoD
Total Costs $1,538,462
Type: Cooperative Agreement (DM102555)
Period: 04/01/11-3/31/14

“Grants to Reduce Domestic Violence Against Women Prevention and Response Project”
Principle Investigator: Smita Majumdar Das (Co-PI: Slep)
Agency: Department of Justice, Office on Violence Against Women
Direct Costs” $298,276
Type: Grant (2009WA-AX-001)
Period: 10/01/09-09/30/12

“Improving the Reliability of the Revised Severity Scale: KSU/Air Force Family /Advocacy Research Analysis & Support Project”
Principle Investigators: Amy M. Smith Slep & Richard E. Heyman
Agency: US Air Force via USDA
Direct Costs: $334,545.00
Type: Contract (S10050)
Period: 09/1/09 – 08/31/10

“Air Force Family Maltreatment Definitions Validation & Training Project”
Principle Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: US Air Force via USDA
Direct Costs: $50,412
Type: Contract (S09048)
Period: 09/01/08-06/30/10 50,412 NA

“Shared novel/challenging activities and relationship quality: Testing key theoretical mechanisms and moderating variables in a large sample of returning combat soldiers”
Principle Investigator: Arthur Aron (Co-PI: Slep)
Agency: NSF
Total Costs: $166,983
Type: Grant (0937559)
Period: 05/01/09-04/30/10

“Air Force Family Maltreatment Definitions Validation & Training Project”
Principle Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: US Air Force via USDA
Direct Costs: $194,520
Type: Contract (S09047)
Period: 09/01/08-06/30/10

“Reliability and Content Validity of Relational Syndrome Assessments”

Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: John E. Fetzer Institute Incorporated
Direct Costs: $54,398
Type: Grant (152005)
Period: 11/01/07-06/30/09
"Family Maltreatment, Substance Problems, and Suicidality: Prevalence Surveillance and Ecological Risk/Protective Factor Models"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: Department of Defense
Total Costs: $961,108
Type: Grant (W81XWH0710328)
Period: 04/01/07–04/30/10

"Refinement of the Department of Defense Family Advocacy Program's Maltreatment Severity Measure: Development and Initial Reliability"
Principal Investigators: Amy M. Smith Slep and Richard E. Heyman
Agency: Department of Defense via the U.S. Air Force
Total Costs: $321,959
Type: Contract (FA8901-06-C-0027)
Period: 9/30/06 – 3/31/08

"Family Maltreatment, Substance Problems, and Suicidality: Randomized Prevention Effectiveness Trial"
Principal Investigators: Richard E. Heyman and Amy M. Smith Slep
Agency: Department of Defense
Total Costs: $1,010,700
Type: Grant (W81XWH0610165)
Period: 2/01/06 – 1/31/10

"Innovative Surveillance and Risk Reduction Systems for Family Maltreatment, Suicidality, and Substance Problems in USAF: Phase 1"
Principal Investigator: Amy M. Smith Slep, Ph.D.
Agency: Department of Defense
Direct Costs: $ 1,032,011
Type: Grant (DAMD17-03-1-0166)
Period: 3/01/03-2/28/06

"2006 Community Assessment plus Secretive Behavior Supplement: Planning and Results"
Principal Investigator: Richard Heyman (Dr. Slep is co-PI)
Agency: United States Air Force/United States Department of Agriculture
Direct Costs: $143,021
Type: contract (CR-19191-A-428142)
Period: 9/01/05 – 2/28/07

"Development of Algorithms for Estimating Partner Abuse and Child Maltreatment Rates in Air Force Communities"
Principal Investigator/co-PI: Amy M. Smith Slep, Ph.D.
Agency: United States Air Force/United States Department of Agriculture
Direct Costs: $812,998

Type: contract (CR-4953-545735)
Period: 4/1/98-8/30/03

"Evaluating Dissemination of Reliable Family Maltreatment Definitions and Decision Processes"
Principal Investigator: Amy M. Smith Slep, Ph.D.
Agency: United States Air Force/United States Department of Agriculture
Direct Costs: $622,998
Type: contract (CR19191-428142)
Period: 8/01/04-8/31/07

"Creating a Reliable Threshold for Family Maltreatment Substantiation Decisions,"
Principal Investigator: Amy M. Smith Slep, Ph.D.
Agency: United States Air Force/United States Department of Agriculture
Direct Costs: $102,889
Type: contract (CR19191-428142)
Period: 2/01/02-1/31/03

"Assessment of the Validity and Reliability of U.S. Air Force Family Advocacy Program's Partner Abuse and Child Maltreatment Severity Measure,"
Principal Investigator: K. Daniel O'Leary (Dr. Slep was co-PI).
Agency: USAF/USDA
Direct Costs: $20,000
Type: Contract.
Period: 4/1/98-3/31/99

Private Foundation Funding

"Reliability and Content Validity of Relational Syndrome Assessments"
Principle Investigator: Richard E. Heyman (Co-PI: Slep)
Agency: John E. Fetzer Institute Incorporated
Direct Costs: $54,398
Type: Grant (152005)
Period: 11/01/07-06/30/09

"Raymond and Rosalee Weiss Think Tank Project"
Chair: Richard E. Heyman, Ph. D. (Dr. Slep was Co- Chair)
Only application (out of 34) funded for Think Tank Project, a pilot for a forthcoming American Psychological Foundation program. 1999.

Invited Presentations

Slep, A. M. S. (April, 2018) Partner Violence: Gender, Risk, and the Role of Dyadic Process. Congress: Handling Conflicts without Violence. Frankfurt, Germany.

Heyman, R. E. & Slep, A. M. S. (May, 2017). Translating Behavioral Science into Improved Oral Health: Using Implementation Science to Explore Barriers to Disseminating Effective Dental Fear Treatment to Dental Practices. ICNARA; Napa, CA.

Slep, A. M. S. (September, 2016) Highlights of a Program of Family Translational Research. Washington State University, Vancouver WA.

Slep, A. M. S. & Heyman, R. E. (December, 2012). Child Maltreatment and the U.S. Military. Institute of Medicine. Washington DC.

Heyman, R. E., Slep, A. M. S., & Wolff, M. S. (September, 2011). Family Impacts on Oral Health: Heuristic Model, Some Preliminary Supportive Results, & Future Directions. National Institute of Dental and Craniofacial Research: National Advisory Dental & Craniofacial Research Council Meeting. Bethesda, MD.

Heyman, R. E. & Slep, A. M. S. (November, 2011). What is Translational Research and Why You (Should) Care. Omega Chapter of Omicron Kappa Upsilion Distinguished Lecture Series. New York, NY.

Slep, A. M. S. (January, 2011). Making Reliable Field Ratings of Maltreatment Incident Severity.. The 25th Annual San Diego International Conference on Child and Family Maltreatment. San Diego, CA.

Slep, A. M. S. (January, 2011). Connections between Partner and Child Physical Abuse. The 25th Annual San Diego International Conference on Child and Family Maltreatment. San Diego, CA.

Slep, A. M. S., (November, 2010). NORTH STAR. Pennsylvania State University, State College, PA.

Slep, A.. M. S. (October, 2009). A New Model to Better Identify Child Maltreatment Deaths. Invited presentation at: We Can Do Better: A National Summit to Reduce Child Maltreatment Fatalities. Pew Charitable Trusts, Washington, DC.

Slep, A. M. S. (March, 2009). Partner and Parental Violence: Connections, Distinctions, and Promising Prevention Approaches. Invited colloquium, Department of Psychology, Long Island University, Garden City, NY.

Slep, A. M. S. (January, 2008). Partner and Parental Violence: Connections, Distinctions, and Promising Prevention Approaches. Invited Grand Rounds presentation. University of Massachusetts Medical Center, Worcestershire, MA.

Slep, A. M. S. (February, 2008). Connections between Partner and Child Physical Abuse. Invited presentation at 2008 NFVLRC Domestic Violence Conference, Sacramento, CA.

Slep, A. M. S. (January, 2008). Helping Children Feel Safe in an Uncertain World. Distinguished Speaker Series, Middle County Library, Selden, NY.

Slep, A. M. S. & Heyman, R. E. (November, 2007). . Invited colloquium. Pennsylvania State University, State College, PA.

Slep, A. M. S. & Heyman, R. E. (May, 2002). *Anger regulation in couples' conflicts: Dyadic processes and individual differences*. Invited paper presented at National Institute of Mental Health's New Directions in Borderline Personality Disorder II, Minneapolis, MN.

Heyman, R. E. & Slep, A. M. S. (2001, July). *Anger escalation and de-escalation in dyadic conflicts.*. Invited paper presented at the NIMH Workshop on Borderline Personality Disorder, New York, NY.

Heyman, R. E. & Slep, A. M. S. (2001, August). *Anger escalation and de-escalation in intimate partner violence couples: Processes and translational implications*. In C. Morf (Chair), *NIMH Close Relationships Workshop*, Rockville, MD.

Teaching

Classroom Teaching

Undergraduate Teaching Assistant

1987	PSY 410	Human Emotions (Izard, Instructor of Record) University of Delaware

Graduate Teaching Assistant

1989	PSY 351	Biological Bases of Development (Kaye, Instructor of Record)
1990	PSY 312	Behavior Problems of Childhood (O'Leary, Instructor of Record)
1990	PSY 315	Behavior Modification (D'Zurilla, Instructor of Record)
1991	PSY 103	Introduction to Psychology (Whitehurst, Instructor of Record)
1991	PSY 312	Behavior Problems of Childhood (O'Leary, Instructor of Record) In fulfillment of the "Substantial Direct Instruction" requirement
1992	PSY 230	Abnormal and Clinical Psychology (Levine, Instructor of Record)
1992	PSY 220	Personality (Liebert, Instructor of Record)

Instructor of Record

1992	PSY 201	Introduction to Psychology (enrollment: 20 [summer[)
1993	PSY 303	Research Methodology Lab (enrollment: 25 [lab section])
1993	PSY 210	Abnormal Psychology (enrollment: 200)
1993	PSY 315	Behavior Modification (enrollment: 60 [evening])
1994	PSY 315	Behavior Modification (enrollment: 100)
1996	PSY 312	Behavior Problems of Childhood (enrollment: 300) [This was post Ph.D.]

Individualized and Small Group Teaching

Undergraduate Teaching

PSY 273	Supervised Research	1997 – present	approximately 1,200 students total
PSY 487	Independent Research	1999 – present	approximately 75 students total
PSY 488	Independent Internship	2000 – present	4 students total

Graduate Teaching

PSY504	First Year Lectures	2003- 2011
CLSCI-DN.7016.1.001	Research Practicum	2011-2012 (one student) 2012-2013 (two students)
Independent Research		Summer 2012 (one D2 student) 2012-2013 (one D2 student)

Mentoring (1998 – present)

Served as mentor for the following student's honors thesis
Jennifer Piscitello

Served as mentor for the following students' Masters degrees:
Michael Lorber
Debbie Leung
Daniela Owen
Ashley Hunt
Danielle Provenzano
Lauren Knickerbocker
Carey Bernini Dowling
Jill Malik
Emile Mulder
Nadia Samad
Jesse Wilkinson

Served as mentor for the following students' Ph.D.s:
Michael Lorber
Julie Schumacher
Jeffrey Snarr
Debbie Leung
Daniela Owen
Danielle Provenzano Mitnick
Lauren Knickerbocker
Jill Malik
Emile Mulder
Nadia Samad
Jesse Wilkinson

Mentees' Grant Funding

Nadia Samad	2012-2013	Elizabeth Munsterberg Koppitz dissertation fellowship (American Psychological Foundation)
	2010-2011	Survey Center Seed Grant (Stony Brook University Survey Center)
Jill Malik	2010-2013	National Research Service Award (National Institute on Aging)
Katherine Casillas	2006-2009	Postdoctoral Minority Supplement Award (National Institute of Child Health and Human Development)
Camilo Ortiz	1999-2003	Postdoctoral Minority Supplement Award (National Institute of Mental Health)
Samara Tinsdale	2016-2018	Predoctoral Minority Supplement Award (NIDCR)
Molly Franz (University of Nebraska)	2016-2018	Mentored Pre-doctoral Training Grant Award

Additional Committee Work

Dissertation committees:
Jeffrey Snarr
Debbie Leung
Tamara DelVecchio
Adela Apetroaia
Diana Wais
Heidi Lary

Thesis committees
Jeffrey Snarr
Vincent Grande
Caitlin Walsh
Jessica Salwen (in progress)

Specialties area (comprehensive exam) committees:
Jeffrey Snarr
Evelyn Flaherty
Michael Lorber
Adela Apetroaia
Heidi Lary

NYU Service

Invited presentations to:	NYUCD Group Practice Directors General Practice Residency Directors' Summit
Participation in:	NYUCD Group Practice Directors Retreat 2012 Ad Hoc Curriculum Committee: Development of Course in Student Self-assessment Ad Hoc Curriculum Committee: Development of Course in Peer Assessment Peer Assessment Facilitator Standing Member of CARS
Advising of:	Approximately 60 NYU undergraduate students engaged in voluntary supervised research with the Family Translational Research Group Michael Isaakharian, dental student as a summer research student and academic year research volunteer Maryam Tariq Irshad, NYU student enrolled in the M.A. is psychology program

Editorial and Review Work

American Journal of Public Health, Ad Hoc Reviewer
American Psychologist, Ad Hoc Reviewer
Couple and Family Psychology: Research and Practice

Journal of Abnormal Psychology, Ad Hoc Reviewer
Journal of Clinical Child and Adolescent Psychology, Ad Hoc Reviewer
Journal of Consulting and Clinical Psychology, Ad Hoc Reviewer
Journal of Personality and Social Psychology, Ad Hoc Reviewer
Personal Relationships, Ad Hoc Reviewer
Prevention Science, Ad Hoc Reviewer
Psychological Assessment, Ad Hoc Reviewer
Child Studies, Ad Hoc Reviewer
Child Maltreatment, Ad Hoc Reviewer
Child Abuse and Neglect, Ad Hoc Reviewer

Editorial Boards
- Journal of Family Psychology
- Partner Abuse
- ISRN Public Health

Advisory Panels
- FLASHE II (NCI) [2018-present]
- Psychological Maltreatment Policy committee of Center for Child Policy (American Professional Society on the Abuse of Children, the New York Foundling, and the Institute for Human Services [2019-present]

Center for Scientific Review
- AREA R15 Special Emphasis Panel 2014/10 ZRG1 RPHB-R
  - June, 2014
- SPECIAL EMPHASIS PANEL: ZRG1 RPHB-Y 12 B, Small Business: Psycho/Neuropathology Lifespan Development, STEM Education
  - June, 2019

National Institutes of Mental Health
- B/Start Proposals
- Review Panel for Translational Research on Borderline Personality Disorder

National Institute of Child Health and Human Development
- R13 review of "Research on Children in Military Families: The Impact of Parental Military Deployment and Reintegration on Child and Family Functioning"

Centers for Disease Control – National Center for Injury Prevention

National Institute of Justice

Professional Memberships

American Psychological Association, Member since 1990
Association for Behavioral and Cognitive Therapies, Member since 1990
American Dental Education Association, Member since 2013
American Public Health Association, Member since 2018

Awards

Excellence in Teaching Award, Department of Psychology, SUNY Stony Brook, 1995

CURRICULUM VITAE

Richard E. Heyman, Ph.D.

ADDRESS

Professor
Family Translational Research Group
Faculty of Health
New York University
137 East 25th Street #603
New York, NY 10010
212 –998 –9984
Email: Richard.Heyman@NYU.edu

EDUCATION

INSTITUTION AND LOCATION	DEGREE	YEAR	FIELD OF STUDY
Duke University, Durham, NC	B.S.	1986	Psychology
University of Oregon, Eugene, OR	M.S.	1988	Clinical Psychology
University of Oregon, Eugene, OR	Ph.D.	1992	Clinical Psychology

ACADEMIC POSITIONS

(Full –time positions)

Professor, Faculty of Health, New York University 2011 –
Research Professor, State University of New York at Stony Brook[1] 2006 –2011
Research Associate Professor, State University of New York at Stony Brook**Error! Bookmark not defined.**1999 –2005
Research Assistant Professor, State University of New York at Stony Brook 1996 –1999
Co –Principal Investigator. Stony Brook Domestic Violence Treatment Grant (NIMH grant #R01MH42488) 1994 –1997
Research Scientist, Behavioral Science Associates, Stony Brook, NY 1994 –1996
Post –doctoral Fellow, State University of New York at Stony Brook, Family Violence Training Program (NIMH grant #T32MH19107) 1992 –1994
Pre –doctoral Fellow. University of Oregon Emotion Studies Training Program (NIMH grant #T32MH18935) 1992 –1994
Guest Researcher, Child and Family Research Section, Laboratory of Comparative Ethology, National Institute of Child Health and Human Development, NIH Summer, 1985

OTHER EMPLOYMENT HISTORY

(Full –Time)

Psychology Intern, Eastern Pennsylvania Psychiatric Institute/Medical College of Pennsylvania
Sep –1991 –Aug –1992
Psychiatric Assistant, Closed Adolescent Unit, Psychiatric Institute of Washington, D.C.
May –1986 –1987;
Summer, 1984; Christmas Breaks, 1984 –85 and 1985 –86

[1] Required full review under Stony Brook University's Tenure and Promotion Review process, including outside letters, and approval from department, dean, provost, and president.

Clinical
(Part –Time)
Private Practice, Stony Brook, NY 1994 –2011
Certified psychotherapist, Cognitive Behavioral Analysis System of Psychotherapy. Multi–site chronic depression study funded by Bristol–Myers Squibb 1996 –1997
Couples Therapist, Marital Therapy Clinic, SUNY at Stony Brook 1992 –2000
Partner Abuse Therapist. Stony Brook Treatment Grant (NIMH grant #R01MH42488). 1993 –1995

PROFESSIONAL LICENSES AND CERTIFICATION

Licensure: Psychologist, New York, #011966
Certified psychotherapist, Cognitive Behavioral Analysis System of Psychotherapy.

HONORS/AWARDS

Duke University: B.S., graduated cum laude, with distinction in Psychology

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Psychological Association (1993 –)
Association for Behavior and Cognitive Therapies (1989 –)
Society for Prevention Research (2003 –)

RESEARCH EXPERIENCE

Main Grant Funding

See table at end of CV for listing of grants/contracts as Principal Investigator/Co-Principal Investigator and as Co-Investigator

Other

Chair, Raymond and Rosalee Weiss Think Tank Project. Only application (out of 34) funded for Think Tank Project, a pilot for a forthcoming American Psychological Foundation program. Direct Costs: $2,000 1999

Advisor to Students'/Postdocs' Grants

1. **Katherine Casillas** — Postdoctoral Minority Supplement Award (National Institute of Child Health and Human Development)
2. **Jill Malik** — NRSA, National Institute on Aging (1F31AG037529, $68,960)
3. **Nadia Samad** — Seed grant from Stony Brook Survey Research Center ($10,000); Elizabeth Koppitz Dissertation Fellowship, American Psychological Foundation ($25,000)
4. **Samara Trindade** — Predoctoral Minority Supplement Award (National Institute of Dental and Craniofacial Research)

Mentor for "Mentored Career Development Award"

Maija Reblin (University of Utah) — "Caregiver relationship quality & communication in advanced cancer care." American Cancer Society, 1/01/2014-12/31/2018 ($729,000)

PUBLICATIONS

Peer-Reviewed Journal Articles

1. Bulling, L. J., Baucom, K. J. W., **Heyman, R. E.,** Slep, A. M. S., Mitnick, D. M., & Lorber, M. F. (in press). Predicting program retention in a flexibly-delivered relationship education program for low-income, unmarried parents. *Journal of Family Social Work*. doi: 10.1080/10522158.2019.1681337
2. Foran, H. M., Lorber, M. F., Malik, J., **Heyman, R. E.**, & Slep, A. M. S., & (in press). The Intimate Partner Flooding Scale. *Assessment*. doi: 10.1177/1073191118755911

3. **Heyman, R. E.,** Baucom, K. J. W., Slep, A. M. S., Mitnick, D. M., & Halford, W. K. (in press). An uncontrolled trial of flexibly delivered relationship education with low-income, unmarried perinatal couples. *Family Relations*.
4. **Heyman, R. E.**, Snarr, J. D., Slep, A. M. S., Baucom, K. J. W. & Linkh, D. J. (in press). Self-reporting DSM-5/ICD-11 clinically significant intimate partner violence and child abuse: Convergent and response process validity. *Journal of Family Psychology*. doi: 10.1037/fam0000560
5. Ketchner, D., Trettevik, R., Vadaparampil, S.T., **Heyman, R. E.**, Ellington, L., & Reblin, M. (in press). Caring for a spouse with advanced cancer: Similarities and differences for male and female caregivers. *Journal of Behavioral Medicine*. doi: 10.1007/s10865-019-00128-y
6. Malik, J., **Heyman, R. E.**, & Slep, A. M. S. (in press). Emotional flooding in response to negative affect in couple conflicts: Individual differences and correlates. *Journal of Family Psychology*.
7. Martinez, Y.C., Ellington, L., Vadaparampil, S.T., **Heyman, R. E.** & Reblin, M. (in press). Concordance of Cancer Related Concerns among Advanced Cancer Patient-Spouse Caregiver Dyads. *Journal of Psychosocial Oncology*.
8. Otto, A.K., Ketcher, D., **Heyman, R.E.**, Vadaparampil, S.T., Ellington, L. & Reblin, M. (in press). Communication between advanced cancer patients and their family caregivers: Relationship with caregiver burden and preparedness for caregiving. *Health Communication*.
9. **Heyman, R. E.,** Baucom, K. J. W., Slep, A. M. S., Mitnick, D. M., & Lorber, M. F. (2019). A research program testing the effectiveness of a preventive intervention for couples with a newborn. *Family Process, 58,* 669–684. doi: 10.1111/famp.12428.
10. **Heyman, R. E.,** Slep, A. M. S., Lorber, M. F., Mitnick. D. M., Xu, S., Baucom, K. J. W., Halford, W. K., & Niolon, P. H. (2019). A randomized, controlled trial of the impact of the Couple Care for Parents of Newborns program on the prevention of intimate partner violence and relationship problems. *Prevention Science, 20,* 620-631. doi: 10.1007/s11121-018-0961-y
11. Langhinrichsen-Rohling, J., Snarr, J. D., Slep, A. M. S., & **Heyman, R. E.** (2019). Risk for suicide attempts among United States Air Force active duty members with suicide ideation: An ecological perspective. *Journal of Consulting and Clinical Psychology, 87*, 1124–1136. doi: 10.1037/ccp0000435
12. Otto, A. K., Gonzalez, B. D., **Heyman, R. E.,** Vadaparampil, S. T., Ellington, L., & Reblin, M. (2019). Dyadic effects of distress on sleep duration in advanced cancer patients and spouse caregivers. *Psycho-Oncology, 28*, 2358-2364, doi: 10.1002/pon.5229
13. Trillingsgaard, T., Fentz, H. N., Simonsen, M., & **Heyman, R. E.** (2019). The prevalence of intimate partner violence among couples signing up for universally-offered parent preparation. *PLOS ONE*, 14: e0223824. doi: 10.1371/journal.pone.0223824
14. **Heyman, R. E.**, Kogan, C. S., Foran, H. M., Burns, S. C., Slep, A. M. S., Wojda, A. K., Keeley, J. W., Rebello, T. J., & Reed, G. M. (2018). A case-controlled field study evaluating ICD-11 proposals for Relational Problems and Intimate Partner Violence. *International Journal of Clinical and Health Psychology, 18,* 113-123. doi: 10.1016/j.ijchp.2018.03.001
15. **Heyman, R. E.**, Wojda, A. K., Eddy, J. M., Haydt, N. C., Geiger, J. F., &. Slep, A.M.S. (2018) Dentist-perceived barriers and attractors to cognitive-behavioral treatment provided by mental health providers in dental practices. *Advances in Dental Research, 29, 35-41*. doi: 10.1177/0022034517737023
16. Lorber, M. F., Xu, S., **Heyman, R. E.**, Slep, A. M. S., & Beauchaine, T. P. (2018). Patterns of psychological health problems and family maltreatment among United States Air Force members. *Journal of Clinical Psychology, 74,* 1258–1271. doi: 10.1002/jclp.22594
17. Reblin, M., **Heyman, R. E.**, Ellington, L., Baucom, B. R W, Georgiou, P. G; Vadaparampil, S. T. (2018). Everyday couples' communication research: Overcoming methodological barriers with technology. *Patient Education & Counseling, 101,* 551–556. doi:10.1016/j.pec.2017.10.019

18. Slep, A.M.S., **Heyman R.E.**, Mitnick, D.M., Lorber, M.F., & Beauchaine, T.P. (2018). Targeting couple and parent-child coercion to improve health behaviors. *Behaviour Research and Therapy, 101*, 82–91. doi:10.1016/j.brat.2017.10.003.
19. Thorsen, K. R., Lorber, M. F., Slep, A. M. S., & **Heyman, R. E.** (2018). Adult adiposity linked to relationship hostility for low cortisol reactors. *Journal of Family Psychology*, 32, 197–205. doi:10.1037/fam0000397
20. Balderrama-Durbin, C., Stanton, K., Snyder, D. K., Cigrang, J. A., Talcott, G. W., Slep, A. M. S., **Heyman, R. E.**, & Cassidy, D. G. (2017). The risk for marital infidelity across a year-long deployment. *Journal of Family Psychology, 31*, 629–634. doi:10.1037/fam0000281
21. Feinberg, M. E., Xia, M., Fosco, G. M., **Heyman, R. E.**, & Chow, S.M. (2017). Dynamical systems modeling of couple interaction: A new method for assessing intervention impact across the transition to parenthood. *Prevention Science, 18*, 887–898. doi: 10.1007/s11121-017-0803-3
22. Lorber, M. F., **Heyman, R. E.**, & Slep, A. M. S. (2017). A longitudinal investigation of the psychological health of United States Air Force base communities. *Journal of Community Psychology*, *45*, 1033-1049. doi:10.1002/jcop.21909
23. Lorber, M.F., Maisson, D.J.N., Slep, A.M.S., **Heyman, R.E.**, & Wolff, M.S. (2017). Mechanisms linking interparental aggression to child dental caries. *Caries Research*, 51, 149-159. doi:10.1159/000453672
24. Lorber, M. F., White-Ajmani, M. L., Dixon, D., Slep, A. M. S., & **Heyman, R. E.** (2017). The relations of child adiposity with parent-to-child and parent-to-parent hostility. *Psychology and Health*. doi: 10.1080/08870446.2017.1336238
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Other Book Chapters

178. Hunt, A. N. & **Heyman, R. E.** (2006). Survivor: A series of analogue behavioral observations. In R. Gerrig (Ed.), *The Psychology of Survivor* (pp. 109-122). Dallas: Ben Bella Books.
179. Provenzano, D. M., & **Heyman, R. E.** (2006). Harry Potter and the resilience to adversity. In N. Mulholland (Ed.), *The Psychology of Harry Potter* (pp. 105-122). Dallas: Ben Bella Books.

Manuscripts Submitted for Publication

1. **Heyman, R. E.**, Xu, S., Slep, A. M. S., Baucom, K. J. W., Snarr, J. D., Foran, H. M., Lorber, M. F., & Linkh, D. J. (2019). *High sensitivity and specificity screening for clinically significant intimate partner violence*. Manuscript submitted for publication.
2. Erlanger, A. C. E., **Heyman, R. E.**, & Slep, A. M. S. (2019). *Creating and Testing the Reliability of a Severity of Family Maltreatment Classification System*. Manuscript submitted for publication.
3. Ketcher, D., Stanley, N., Blackburn, C., Otto, A. K., Ellington, L., Vadaparampil, S. T., **Heyman, R. E.**, & Reblin, M. (2019) *Coping and communication: Interviews with spouse caregivers of patients with advanced cancer*. Manuscript submitted for publication.
4. Baucom, K. J. W., Malik, J., **Heyman, R. E.**, & Slep, A. M. S. (2019). *Associations between physical health and relationship satisfaction in couples with children.* Manuscript submitted for publication
5. Malik, J., **Heyman, R. E.**, & Slep, A. M. S. (2019). *Measuring the Ecological Validity of Couples Observations*. Manuscript submitted for publication.
6. Mitnick, D. M., Dills, A. L., Slep, A. M. S., **Heyman, R. E.**, & Malik, J. (2019). *Family Influences on Caries in Grenada*. Manuscript submitted for publication.
7. Reblin, M., Stanley, N., Blackburn, C., Ellington, L, Vadaparampil, S.T., & **Heyman, R.E.** (2019). The *impact of relationship quality and communication styles on coping among spouse caregivers of patients with advanced cancer*. Manuscript submitted for publication.
8. Reblin, M., Sutton, S.K., Vadaparampil, S.T., **Heyman, R.E.** & Ellington, L. (2019). *Behind closed doors: How advanced cancer couples communicate at home*. Manuscript submitted for publication.
9. Slep, A. M. S., Heyman, R. E., Lorber, M. F., Baucom, K. J. W., & Linkh, D. J. (2019). *Evaluating the Effectiveness of NORTH STAR: A Community-Based Framework to Reduce Secretive Adult Problems*. Manuscript submitted for publication
10. Xu, J., Ellington, L., **Heyman, R. E.**, Vadaparampil, S. T., Reblin, M. (2019*). Money matters: An analysis of advanced cancer couples' communication about financial concerns*. Manuscript submitted for publication.
11. Xu, S., Lorber, M. F., **Heyman, R. E.**, & Slep, A. M. S. (2019). *Development of a Brief Screener for Crosscutting Patterns of Family Maltreatment and Psychological Health Problems*. Manuscript submitted for publication.

Manuscripts About To Be Submitted for Publication (Nearly Complete)

1. **Heyman, R. E.** Slep, A. M. S., Malik, J., & Baucom, K. J. W. (2019). *Do unhappy couples really have "communication skills deficits"*? Manuscript submitted for publication.
2. **Heyman, R. E.** Slep, A. M. S., Malik, J., & Baucom, K. J. W. (2019). *Conflict behavior and problem-solving quality predict the degree of both relationship distress and intimate partner violence*. Manuscript submitted for publication.

Published Clinical Treatment Manuals

1. Neidig, P. H., **Heyman, R. E.**, & Smith-Slep, A. S. (1995). Domestic Conflict Containment Program, Phase II: Parenting. Stony Brook, NY: Behavioral Science Associates.
2. Smith-Slep, A. S. **Heyman, R. E.**, & Neidig, P. H. (1995). Managing your child's behavior: Ages birth to four. Stony Brook, NY: Behavioral Science Associates.

Published Professional Newsletter Articles

1. **Heyman, R. E.** & Slep, A.M. S. (2006). Partner Maltreatment: Steps toward improved understanding, measurement, and intervention. *Family Psychologist*.
2. Snyder, D. K., Heyman, R., & Haynes, S. N. (2004). Integrating science with practice when assessing couples. *The Family Psychologist, 20*, 11-13.
3. **Heyman, R. E.** & Slep, A.M. S. (2000, Spring/Summer). The funding process for marital researchers (or how we learned to stop worrying and love writing grants). *Couples Research & Therapy: The Newsletter of the Couples Research & Therapy AABT Special Interest Group*.

Unpublished Technical Manuals

1. **Heyman, R. E.** & Vivian, D. (2013). *RMICS: Rapid Marital Interaction Coding System. Training Manual for coders*. New York: New York University.
2. **Heyman, R. E.** (1991). *VICCS: Video-recall Cognitive Coding System. Training manual for coders*. University of Oregon, Eugene, OR.
3. Weiss, R. L. & **Heyman, R. E.** (1990). Marital Interaction Coding System-IV (MICS-IV) Printout Guide.

PRESENTATIONS

Conference Keynote Presentations

1. **Heyman, R. E.** (2008, July). *Partner and Child Maltreatment Diagnostic System: 41-Site Dissemination Trial, the DSM-V, and a Research and Clinical Agenda*. Keynote address, International Family Violence and Child Victimization Research Conference, Portsmouth, NH.
2. **Heyman, R. E.** (2016, June). *Improving Screening, Intervention, and Research via Evidence-Based Criteria for Family Maltreatment and Couple Relational Problems*. 38th Annual Meeting & Open Conference of the American Family Therapy Association, Denver.

National Academy of Sciences

3. **Heyman, R. E.** (2016, May). Observational methods. In NAS-NIA workgroup, A Call for Novel Methodologies and Approaches for Dyadic Analyses in the Context of the Family and Intimate Relationships. One of five invited presenters/discussants. Washington, DC.

Invited presentations

4. **Heyman, R. E.** Slep, A. M. S. , Baucom, K. J. W., Mitnick, D. M., Lorber, M. F., & Xu, S. (2017, August). Prevention Programs For Couples with a Newborn: Promising or Problematic? Presented at Child Development: The Roles of the Family and Public Policies conference, Vejle, Denmark.

5. **Heyman, R. E.** and Slep, A.M.S. (with Wojda, A. K., Eddy, J. M., Haydt, N. C., Geiger, J. F., &. (2017, May). Translating Behavioral Science into Improved Oral Health: Using Implementation Science to Explore Barriers to Disseminating Effective Dental Fear Treatment to Dental Practices. Presented at the International Conference on Novel Anticaries and Remineralizing Agents (Third Conference). Napa, CA.
6. **Heyman, R. E.** (2015, September). *Family Translational Research: What It Is and Why You (Should) Care.* Invited colloquium to the St. John's University Psychology Department.
7. **Heyman, R. E.** (2015, September). *Family Impacts on Oral Health*. Invited presentation to the California Dental Foundation Oral Health Education Forum @ NYU.
8. **Heyman, R. E.** (2014, October). *Science-to-practice research on hidden family and individual problems*. Invited presentation at the TrygFonden's Centre for Child Research, Aarhus University, Aarhus, Denmark.
9. **Heyman, R. E.** (2014, June). *Assessment of interpersonal mechanisms*. Invited presentation to the NIH Science of Behavior Change Common Fund meeting, Bethesda, MD.
10. **Heyman, R. E.** & Slep, A. M. S. (2013, September). *Improving The Behavioral Health of Military Communities: Two University-AF Partnerships (NORTH STAR & ARMOR) for Translating Evidence-Based Interventions into Community Action*. Invited presentation at the Forum on Military Families in Transition: Stress, Resilience, and Well-Being Walter Reed Army Institute of Research, Silver Spring, MD.
11. **Heyman, R. E.** & Slep, A. M. S. (2013, March). *Family Translational Research Group: Overview of FTRG Research Program and Implications for Family and Physical Health*. Invited talk presented at the Center for Alaska Native Health Research, Fairbanks, AK.
12. **Heyman, R. E.** (2013, February). *PTSD and Intimate Partner Violence in Military Members*. Invited panel discussion sponsored by Verizon Wireless, hosted by Maria Hinojosa from PBS/NPR. New York, NY.
13. **Heyman, R. E.** & Slep, A. M. S. (2012, December). *Family Maltreatment in the U.S. Military*. Institute of Medicine, Washington, DC.
14. **Heyman, R. E.** & Slep, A. M. S. (2011, November). *Family Translational Research: What It Is and Why You (Should) Care.* Distinguished Lecturer Series. Omicron Kappa Upsilon Omega Chapter (Dental Honor Society), New York University College Of Dentistry.
15. **Heyman, R. E.**, Slep, A. M. S., & Wolff, M. (2011, September). *Family Impacts on Oral Health: Heuristic Model, Some Preliminary Supportive Results, & Future Directions*. Invited presentation to the National Advisory Dental and Craniofacial Research Council Meeting.
16. **Heyman, R. E.**, & Slep, A. M. S. (2011, May). *Family Maltreatment: Definitions, Screening, Risk, and Prevention*. Invited address to the National Child Traumatic Stress Network.
17. **Heyman, R. E.** & Slep, A. M. S. (2010, August). *NORTH STAR Initiative Randomized Controlled Trial: AF's Community Prevention Approach for Family Maltreatment, Suicidality, and Alcohol/Drug Misuse*. Invited colloquium address, The Pennsylvania State University, State College, PA.
18. **Heyman, R. E.** & Slep, A. M. S. (2010, October). Relational Diagnoses: From Reliable Rationalist Diagnoses to Testable Taxonic Hypotheses. Invited paper at the John Fetzer Foundation/World Health Organization Meeting, *Relational Processes and the ICD-11*. Ascona, Switzerland.
19. **Heyman, R. E.** (2010, August). *NORTH STAR Initiative Randomized Controlled Trial: AF's Community Prevention Approach for Family Maltreatment, Suicidality, and Alcohol/Drug Misuse*. Invited Grand Rounds, Philadelphia VA Medical Center, Philadelphia, PA.
20. **Heyman, R. E.**, & Slep, A. M. S. (2008, September). *Empirically Guided Community Intervention for Family Violence*. Invited paper at the Research Symposium on Military Families, Indianapolis, IN.

21. **Heyman, R. E.** & Slep, A. M. S. (2008, August). Empirically Guided Community Intervention for Family Violence. Invited talk in President's Symposium, *Violence Against Women: Innovations to Translate Science to Practice*. American Psychological Association Annual Meeting, Boston.
22. **Heyman, R. E.** & Slep, A. M. S. (2007, November). Assessing clinically significant relational syndromes. Invited presentation to the Group for the Advancement of Psychiatry — Family Workgroup. White Plains, NY.
23. Slep, A. M. S. & **Heyman, R. E.** (2007, November). *Community Prevention for Adult Problems: Evolving Lessons from a 24-Community Randomized Controlled Trial and from a Technology-Enhanced New Parents Program*. Invited colloquium address, The Pennsylvania State University, State College, PA.
24. **Heyman, R. E.** (2005, April). *Community-Based Prevention For Family Maltreatment, Alcohol Abuse, Drug Use, And Suicidality*. Invited colloquium at Griffith University, Brisbane, Australia.
25. **Heyman, R. E.** (2005, April). *Engaging Communities in Prevention Activities: Lessons from work with the US Air Force*. Invited half-day workshop at Griffith University, Brisbane, Australia.
26. **Heyman, R. E.** (2005, April). *Treatment of Domestic Violence*. Invited full day workshop at Griffith University, Brisbane, Australia.
27. **Heyman, R. E.** (2005, March). Reliable and valid assessment of relational disorders. Fetzer Foundation/National Institute of Mental Health Conference: RelationalProcesses and DSM-V: From Neuroscience to Assessment and Treatment.
28. Slep, A. M. S. & **Heyman, R. E.** (2002, May). *Anger regulation in couples' conflicts: Dyadic processes and individual differences*. Invited paper presented at National Institute of Mental Health's New Directions in Borderline Personality Disorder II, Minneapolis, MN.
29. **Heyman, R. E.** & Slep, A. M. S. (2001, July). *Anger escalation and de-escalation in dyadic conflicts.* Invited paper presented at the NIMH Workshop on Borderline Personality Disorder, New York, NY.
30. **Heyman, R. E.** & Slep, A. M. S. (2001, August). *Anger escalation and de-escalation in intimate partner violence couples: Processes and translational implications*. Invited paper presented at the National Institutes of Mental Health Close Relationships summit, Rockville, MD.

Conference Organizer

1. "International Public Health Priorities for Relational Problems: Implications for the ICD-11" (October, 2010). Conference funded by the Fetzer Institute. Co-chair of organizing committee for the international conference. Ascona, Switzerland.
2. "Relational Processes and DSM-V." (May, 2007) Conference funded by the Fetzer Institute. One of five organizers for the conference 2006-2007. San Diego, CA.
3. "Relational Processes in Mental Health" (May, 2005; held in consultation with the steering committee for the DSM-V conference series). Conference funded by the Fetzer Institute and the NIMH. One of five organizers for the international conference 2004-2005. Bethesda, MD

Conference Presentations (since arriving at NYU, July 2011)

Balderrama-Durbin, C. M., Snyder, D. K., Cigrang, J., Talcott, G. Tatum, J., Baker, M., Cassidy, D., **Heyman, R. E.**, & Slep, A.. (2011, November). *Social Support, Partner Combat Disclosure, and PTSD Following High-Risk Deployment to Iraq* . Poster presented at the 45th Annual Convention of the Association for Behavioral and Cognitive Therapy, Toronto, Canada.

Heyman, R. E. (2011, November). Panel discussion. In B. Doss (Chair), *Disseminating Couple Interventions in the 21st Century: Harnessing Technology to Intervene on a Large Scale*. Panel discussion presented at the 45th Annual Convention of the Association for Behavioral and Cognitive Therapy, Toronto, Canada.

Snyder, D. K., Cigrang, J., Talcott, G., Tatum, J., Baker, M., Cassidy, D., Balderrama-Durbin, C. M., **Heyman, R. E.**, & Slep, A.. (2011, November). Emerging Evidence Regarding PTSD and Relationship Functioning in OEF/OIF Combat Veterans. In D. K. Snyder (Chair) *Emerging Evidence Regarding PTSD and Relationship Functioning in OEF/OIF Combat Veterans*. Symposium presented at the 45th Annual Convention of the Association for Behavioral and Cognitive Therapy, Toronto, Canada.

Samad, N., Slep, A. M. S., **Heyman, R. E.** (2011, November). *Parenting, Interparental Conflict, and Adolescent Internal Representations and Social Competence*. Poster presented at the 45th Annual Convention of the Association for Behavioral and Cognitive Therapy, Toronto, Canada.

Wilkinson, J., **Heyman, R. E.**, & Slep, A. M. S. (2011, November). *Relationship Self-Efficacy Beliefs and the Perpetration of Partner Maltreatment*. Poster presented at the 45th Annual Convention of the Association for Behavioral and Cognitive Therapy, Toronto, Canada.

Heyman, R. E. (2012, November). Discussant. In K. Sanford (Chair), *Compass May Reverse its Polarity: New Principles for Behavior Change in Couples*. Symposium presented at the 46th Annual Convention of the Association for Behavioral and Cognitive Therapy, National Harbor, MD.

Heyman, R. E. (2012, November). Discussant. In S. Scott (Chair), *Increasing Positive Outcomes for Couples From Diverse Backgrounds: Addressing Service Barriers and Relationship Education Content*. Symposium presented at the 46th Annual Convention of the Association for Behavioral and Cognitive Therapy, National Harbor, MD.

Samad, N., Malik, J., **Heyman, R. E.** & Slep, A. M. S. (2012, November). *Attachment, Relationship Satisfaction, and Intimate Partner Violence*. Poster presented at the 46th Annual Convention of the Association for Behavioral and Cognitive Therapy, National Harbor, MD.

Wilkinson, J., Slep, A. M. S. & **Heyman, R. E.** (2012, November). Relationship Self-Efficacy: Scale Development and Validation. Poster presented at the 46th Annual Convention of the Association for Behavioral and Cognitive Therapy, National Harbor, MD.

Wilkinson, J., **Heyman, R. E.** & Slep, A. M. S. (2012, November). Men's Perpetration of Intimate Partner Violence: The Mediational Role of Relationship Self-Efficacy. Poster presented at the 46th Annual Convention of the Association for Behavioral and Cognitive Therapy, National Harbor, MD.

Samad, N., Slep, A. M. S., **Heyman, R. E.** (2013, April). *The Influences of Interparental Conflict and Parenting on Children's Social Competence*. Poster presented at the 2013 Biennial Meeting of the Society for Research in Child Development.

Inaba, R., Kogen, R., Papadopoulos, E., Erlanger, A.C.E., **Heyman, R. E.**, & Slep, A.M.S. (2013, August). *Productive listening skills in dentist-patient interactions*. Poster presented to the Summer Research Day at the New York University College of Dentistry, New York, NY.

Balderrama-Durbin, C.M., Snyder, D.K., Cigrang J.A., Fissette, C. L., Talcott, G., Tatum, J., Cassidy, D. G., Baker, M., Sonnek, S., Slep, A. M. S., & **Heyman, R. E.** (2013, November). *The Impact of Deployment on the Risk for Infidelity* Poster presented at the 47th Annual Convention of the Association for Behavioral and Cognitive Therapy, Nashville, TN.

Heyman, R. E. (2013, November). Panel Discussion. In K. J. W. Baucom (Chair). *Beyond the Intent to Reach: Recruitment of Couples for Intervention Research*. Panel discussion presented at the 47th Annual Convention of the Association for Behavioral and Cognitive Therapy, Nashville, TN.

Snyder, D. K., Balderrama-Durbin, C., Cigrang, J., Talcott, G. W., Slep, A., & **Heyman, R.** (2015, August). Help-seeking among Airmen in distressed relationships: Implications for alternative delivery systems. In J. C. Flanagan & M. L. Kelley (Co-chairs), *Mental health, alcohol use, and relationship satisfaction among military members and veterans*. Symposium presented at the meeting of the American Psychological Association, Toronto, Canada.

Heyman, R. E., Slep, A. M. S., Sabathne, C., Erlanger, A. C. E., Hsu, T. T., Snyder, D.K., Balderrama-Durbin, C., Cigrang, J. A., Talcott, G. W., Tatum, J., Baker, M. T., Cassidy, D., & Sonnek, S. M. (2015, November). Development of a multilevel prevention program for improved relationship

functioning in active duty military members. In T. Gray (chair), Up-Armoring Families: Disseminating Empirically Supported Relationship Interventions for Military Couples. Symposium at the 49th Annual Meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Heyman, R. E., (2015, November). *Panel discussant*. In S. L. Sayers (chair), *The Future of Research on Couples and Families in Military and Veteran Populations*. Panel discussion at the 49th Annual Meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Fissette, C. L, Snyder, D. K., Balderrama-Durbin, C. M., Balsis, J. A., Cigrang, J. A., Talcott, **Heyman, R. E.,** Smith Slep, A. M., Tatum, J., Baker, M., Cassidy, D.G., & Sonnek, S. (2015, November). *Predictors of Alcohol Misuse Following a Combat Deployment*. Poster presented at the 49th Annual Meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Osborne, L., Snyder, D. K., Balderrama-Durbin, C. M., Cigrang, J. A., Talcott, Smith Slep, A. M., **Heyman, R. E.**, Tatum, J., Baker, M., Cassidy, D.G., & Sonnek, S. (2015, November). *Predictors of Chronic Pain and Somatic Functioning Following a Combat Deployment*. Poster presented at the 49th Annual Meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Burns, S. C., Kogan, C. S., Reed, G. M., Heyman, R. E., Slep, A. M. S. Foran, H. M. & Keeley, J. W.. (2016). Use of Proposed ICD-11 Relationship Problem and Maltreatment Guidelines in Response to Clinical Vignettes in India and Canada. Paper presented at annual meeting of the Canadian Psychological Association.

Burns, S. C., Kogan, C. S., Reed, G. M., Heyman, R. E., Slep, A. M. S. Foran, H. M. & Keeley, J. W.. (2016). Use of Proposed ICD-11 Relationship Problem and Maltreatment Guidelines in Response to Clinical Vignettes in China and Canada. Paper presented at annual meeting of the International Association of Relationship Research, Toronto, Canada.

Kuck, N. M., Cigrang, J. A., Snyder, D. K., Slep, A. M. S., & **Heyman, R. E.** (2016, August). Gender and adverse family of origin experiences in military couples. Poster presented at the meeting of the American Psychological Association.

Reblin, M., Gonzalez, B.D., Heyman, R.E., Vadaparampil, S.T. & Ellington L. (November, 2018). *Relationships between distress and sleep in advanced cancer patients and spouse caregivers*. Poster presented to the Palliative and Supportive Care in Oncology Symposium, San Diego, CA.

Cigrang, J. A., Yahle, C., Lorko, K., Balderrama-Durbin, C., Snyder, D., Mitnick, D., Wijdenes, K., Lorber, M., Slep, A., & **Heyman, R. E.** (2019, October). *Predicting Intimate Relationship Health from Adverse Childhood Experiences among United States Air Force Active Duty Personnel*. Poster presentation presented at the 4th Annual San Antonio Combat PTSD Conference, San Antonio, Texas.

Reblin, M., Ellington, L., **Heyman, R.E.**, & Vadaparampil, S.T. (2020, June). *Interpersonal processes of cancer and relationship talk: Advanced cancer patient-spouse caregiver communication in the home.* Eighth Dyadic Coping Conference, Washington, DC.

SERVICE ACTIVITIES

University Service

1. New York University — Member, Search committee for Chair of Department of Cariology and Comprehensive Care (2018–2019)
2. New York University College of Dentistry — Promotions and Tenure Committee (2015-2018)
3. New York University — Chair, Search Committee for Chair of Department of Epidemiology and Health Promotion (2012–2013)
4. New York University — Research Advisory Committee, NYU College of Dentistry (2011-2015)
5. Stony Brook University — Search committee for Associate Vice President for Research (2007)
6. Stony Brook University — Department of Psychology Graduate Curriculum committee (2006)
7. Stony Brook University — Clinical Area Curriculum committee (2006)

Student Mentorship

1. Psychology Ph.D. Students

Advisor to past Psychology Ph.D. students (with graduation year): Shari Feldbau-Kohn (2001); Daniela Owen (2009), Danielle Provenzano Mitnick (2010); Samara Pulver Tetenbaum (2010; dissertation advisor for final year after her advisor died); Lauren Knickerbocker (2011); Emile Mulder (2013); Nadia Samad (2014)

Psychology Ph.D. Dissertation committees: Kenneth Chase (1999), Karin Schlee (1999), Jodi Steele (1999), Penny Leisring (1999), Chiyoko Lord (1999), Celene Fyffe (2000), Shari Feldbau-Kohn (2001), Melissa Ramsey Miller (2009), Anna Floyd (2009), Jada Hamilton (2009), Daniela Owen (2009), Danielle Provenzano Mitnick (2010), Stefan Schneider (2010); Natalie Nardone (2011); Lauren Knickerbocker (2011); Lauren Moskowitz (2012); Nadia Samad (2013); Emile Mulder (2013)

Psychology Master's Thesis committees:

(1994 –2011) Karin Schlee, Kenneth Chase, Shari Feldbau-Kohn, Daniela Owen, Ashley Hunt, Danielle Provenzano, Lauren Knickerbocker, Jill Malik, Emile Mulder, Nadia Samad, Jesse Wilkinson

(2019– present) Alexandra Wojda (2019; UNC-Chapel Hill)

Specialties area (Psychology Ph.D. comprehensive exam) committees: Karin Schlee, Penny Leisring, Gina Abbott, Celene Fyffe, Stacey Storch, Patti Fritz, Erica Woodin, Daniela Owen, Danielle Provenzano Mitnick, Lauren Knickerbocker, Samara Pulver Tetenbaum, Rachel Hershenberg, Jill Malik, Emile Mulder, Natalie Nardone, Lauren Moskowitz, Nadia Samad

Advisor to undergraduate honors program projects: Christine Verdino (1997), Katherine Arnold (1998), Tania Bazzia (2009), Jennifer Piscitello (2010)

2. D.D.S. Pre-doctoral Students (NYUCD Summer Research Program)

Summer, 2013: Rie Inaba, Rakhmin Kogen, Emanuel Papadopoulos

D.D.S. Honors Research Students

Zachary DiSpirito ('19), Joseph Geiger ('19), Jacqueline Glazman ('19), Nicole Haydt ('19), Sammie Jo Fat ('20), Charlotte Guerrera ('20), Allison Rascon ('20)

International Psychology Ph.D. Students

Tea Trillingsgaard (Denmark; 3 month residency with Dr. Heyman, 2010)

Jin Lang (China; 1 year residency with Dr. Heyman, 2014-15)

Editorial Activities

1. Consulting editor, *Journal of Family Psychology* (2005- present)
2. Editorial board member, *Partner Abuse* (2009-present)
3. Editorial board member, *Personal Relationships* (1997-1999)
4. Ad hoc reviewer, *Assessment, Behavioral Assessment, Behavior Therapy, Children and Youth Services Review, Clinical Psychology Review, Cognitive Therapy and Research, Denistry, Family Process, Journal of Abnormal Psychology, Journal of Consulting and Clinical Psychology, Journal of Family Psychology, Journal of Health Services Research & Policy, Journal of Marriage and Family, Journal of Personality and Social Psychology, Military Behavioral Health, Military Medicine, Personality and Individual Differences, Prevention Science, Psychological Assessment, Social Development, Violence Against Women, Violence and Victims*

National Research Advisory Panels

- National Institute of Dental and Craniofacial Research, Data and Safety Monitoring Board. (2009-2017)
- Strengthening Healthy Marriages (10 year, $10M multi-site prevention study) (2004-2013)

- National Incidence Study of Child Abuse and Neglect, 4 (Once every decade, multisite national assessment of prevalence of child maltreatment) (2000-2004)

Local Data and Safety Monitoring Boards

6. Chair of Data and Safety Monitoring Board for NIMH-funded (R01MH077197-01) University of Pennsylvania clinical trial (Martin Franklin, Ph.D. PI) "Behavior Therapy for Pediatric Trichotillomania" (10/1/2008 – 9/30/2014)

Grant Review Panels

- National Institute of Health — Center for Scientific Review
  - National Institute of Dental and Craniofacial Research Special Emphasis Panel ZDE1 CF (03) (June, 2015)
  - National Institute of Dental and Craniofacial Research Special Emphasis Panel ZDE1 SM (13) (March, 2015)
  - National Institute of Dental and Craniofacial Research Special Emphasis Panel ZDE1 SM (17) (October, 2014)
  - National Institute of Dental and Craniofacial Research Special Emphasis Panel ZDE1-MH 10-1 (March, 2013)
  - National Institute of Dental and Craniofacial Research Special Emphasis Panel ZDE1 RK191, NIDCR Clinical Trial Planning Grant (R34) and Cooperative Agreement (U01). (July, 2012)
  - Risk, Prevention and Intervention for Addictions Study Section (2009- 2010)
- Centers for Disease Control and Prevention
  - Dissertation Grant Awards for Violence-Related Injury Prevention Research in Minority Communities (2008)
  - Dissertation Grant Awards for Violence-Related Injury Prevention Research in Minority Communities (2006)
  - Experimental Evaluation of Parenting Program for Fathers (2004)

EDUCATIONAL ACTIVITIES

New York University College of Dentistry

DN.2610 — Principles of Behavior and Behavior Change

Psychology Ph.D. Courses — Stony Brook University

Couples Intervention Course/Practicum Summer 2007, 2009

Couples Intervention Practicum 2007 –2008

Clinical supervisor, Marital Therapy Clinic, SUNY at Stony Brook. 1992 –2001

Couples therapy seminar, SUNY at Stony Brook. Taught graduate seminar on couples therapy. Summer, 1993, 1996, 2000

Psychology B.S. Courses — University of Oregon

Graduate Teaching Fellow, Instructor, undergraduate Research Methods course, Department of Psychology, University of Oregon (Taught course 6 times) 1989 –1991

Psychology B.S. Courses (Teaching Assistant)

Graduate Teaching Fellow, Teaching Assistant, Department of Psychology, University of Oregon 1987 –1988

Teaching Assistant/Practicum Supervisor, undergraduate Child Clinical Psychology course, Department of Psychology, Duke University. 1985 –1986

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
Note: Role is Principal Investigator except as noted					
1	NIMH	Treatment of Spouse Abuse (ROLE: Co-PI)	1992-1997	$1,576,828	R01MH42488
2	Dept. of the Army	Comparisons between Army and Civilian Domestic Violence Rates	1995-1996	$125,000	MDA 903920059
3	NIMH	Anger Escalation and De-Escalation in Aggressive Men	4/1/98-1/31/02 (inlcludes 1 yr no-cost extenstion)	$508,600	R01MH5777903
4	USDA/USAF	Development of Algorithms for Estimating Partner Abuse and Child Maltreatment Rates in Air Force Communities Archival Phase	4/01/98 - 3/31/99	$100.000	CR-4953-545735
5	USDA/USAF	Assessment of the Validity and Reliability of U.S. Air Force Family Advocacy Program's Partner Abuse and Child Maltreatment Severity Measure	4/01/98 - 3/31/99	$20,000	CR-4953-545135
6	USDA/USAF	Development of Algorithms for Estimating Partner Abuse and Child Maltreatment Rates in Air Force Communities Stage 1	10/1/99-8/31/02 (including no-cost extension)	$231,897	CR-19245-545774
7	USDA/USAF	Development of Algorithms for Estimating Partner Abuse and Child Maltreatment Rates in Air Force Communities Stage 2	9/1/01-8/31/03	$324,116	CR-19245A-545774
8	Centers for Disease Control	Risk for Partner Abuse: Proximal and Distal Factors	09/30/01 - 9/29/02 (including 1 yr. no-cost extension)	$239,544	R49/CCR 2 1855402

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
9	USDA/USAF	Creating a Reliable Threshold for Family Maltreatment Substantiation Decisions	2/01/02 -7/31/03	$144,881	CR-19245B-545774
10	NIMH	Violent, Unhappy, & Functional Couples: Regulating Anger	2/1/03-1/31/07	$564,375	R01-MH06704303
11	Congressionally Directed Med. Research Programs (DoD)	Innovative Surveillance and Risk Reduction Systems for Family Maltreatment, Suicidality, and Substance Problems in USAF – NORTH STAR Stage 1	3/1/03-2/28/06	$1,553,178	DAMD 17-03-1-0166
12	USDA/USAF	Development of Algorithms for Estimating Partner Abuse and Child Maltreatment Rates in Air Force Communities - Stage 3	9/1/03-8/31/05	$292,184	CR-19191A-545810
13	National Institute of Child Health and Human Development	What Facets of Family Violence Affect Child Functioning?	06/07/04- 05/31/10 (inlcludes 1 yr no-cost extenstion)	$1,979,254	R01 HD046901-05
14	USDA/USAF	Evaluating Processes for Making Reliable Family Maltreatment Substantiation Decisions	8/1/03-7/31/04	$100,270	CR-19191-545810
15	USDA/USAF	Developing Training Material for Dissemination of Reliable Family Maltreatment Definitions and Decision Processes	9/1/04-8/31/06	$229, 797	CR-19191B-545810
16	USDA/USAF	Evaluating Dissemination of Reliable Family Maltreatment Definitions and Decision Processes	9/1/04- 11/30/06	$468,925	CR-19191-428142

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
17	Congressionally Directed Med. Research Programs (DoD)	NORTH STAR Stage 2B: Family Maltreatment, Substance Problems, and Suicidality —Randomized Prevention Effectiveness Trial	02/01/06–01/31/10	$1,010,021	W81XWH061165
18	Admin. For Children and Families	Healthy Marriage Demonstration Priority Area: 7	09/1/06-12/31/11	$3,061,000	90FE013101
19	Department of Defense	Refinement of Family Advocacy Program (FAP) Maltreatment Severity Scales	10/01/06- 6/30/10	$321,959	FA890106C0027
20	Congressionally Directed Med. Research Programs (DoD)	NORTH STAR Stage 2A: Family Maltreatment, Substance Problems, and Suicidality —Prevalences and Risk/Protective Factors	04/01/07–04/30/10	$952,491	W81XWH0710328
21	CDC	Risk and Protective Factors for Partner Abuse, Child Maltreatment, & Suicidality	9/01/08–12/31/09	$874,244	5R49CE00091902
22	John E. Fetzer Institute Incorporated	Reliability and Content Validity of Relational Syndrome Assessments	11/01/07-06/30/09	$54,398	152005
23	USDA/USAF	Air Force Family Maltreatment Definitions Validation & Training Project	09/01/08-06/30/10	$194,520	S09047

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
24	USDA/USAF	Air Force Family Maltreatment Definitions Validation & Training Project	09/01/08-06/30/10	$50,412	S09048
25	CDC	Dyadic, Skills-Based Primary Prevention for Partner Violence in Perinatal Parents	09/30/2007-09/29/2012	$1,999,990	5U49CE00124602
26	Dept. of Justice Office on Violence Against Women	Grants to Reduce Domestic Violence Against Women Prevention and Response Project (Stony Brook University)	10/01/09-09/30/12	$298,276	2009WA-AX-001
27	USDA/USAF	Improving the Reliability of the Revised Severity Scale	09/1/09 – 08/31/10	$334,545	S10050
28	NIDCR	Impact of Family Functioning and Violence on Adults, and Children's Oral Health	08/08/09-7/31/11	$439,900	1R21DE01953701A1
29	NIDCR	ARRA: Impact of Family Functioning and Violence on Adults, and Children's Oral Health	09/25/09-08/31/11	$570,520	3R21DE01953701A1 S1
30	USDA/USAF	Improving the Reliability of the Revised Family Maltreatment Severity Scale	09/01/09- 08/31/11	$194,520	S09047
31	Congressionally Directed Med. Research Programs (DoD)	Unlocking the Power of the Military Social Network	4/1/2011 –3/31/2014	$1,538,462	DM102555
32	Congressionally Directed Med. Research Programs (DoD)	Randomized Controlled Trial to Improve the Effectiveness of the NORTH STAR Prevention Framework by Embedding Evidence-Based Prevention Within the Military Unit	9/30/2011-9/29/2018	$3,453,998	10600451

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
33	United States Marines	Develop a Family Advocacy Program Desk Reference Guide for the Marine Corps Family Advocacy Program	9/1/2011-8/31/2012	$83,362.12	H0111-R-0001
34	NIDCR	Planning Parental/Motivational Interventions to Prevent Early Childhood Caries	09/23/2011 – 08/31/2013	$247,940	1R34DE022269-01
35	USDA/USAF	Barriers and Attractors to Mental Health Help-Seeking in the U.S. Air Force	9/1/2011-8/31/2013	$180,000	2011-48740-31167
36	USDA/USAF	Revising the DoD FAP Severity Scales	10/01/11-9/30/12	$63,000	2009-48353-06045
37	Dept. of Justice Office on Violence Against Women	Grants to Reduce Domestic Violence Against Women Prevention and Response Project (St John's University; PI: Tamara Del Vecchio; Subcontract PIs: Heyman & Slep)	01/11-9/30/14	Subcontract Direct Costs: $78,000	DB#2328
38	USDA/USAF	Unified Strategy of Action for Airman Resilience and Maintenance of Operational Readiness (USAF-ARMOR)	06/01/12-8/31/13	$575,000	2010-48696-21892
39	USDA/USAF	AF Dissemination of the New DoD Severity Scale	10/01/11-9/30/13	$180,000	
40	Dept. of Justice Office on Violence Against Women	Grants to Reduce Domestic Violence Against Women Prevention and Response Project (Stony Brook University PI: Amy Hammock; Subcontract PIs: Heyman & Slep)	10/01/12-9/30/15	Subcontract Direct Costs $60,000	
41	USDA/USAF	Developing the Next Generation of Family Maltreatment Prevention Training	1/1/13-12/31/13	$91,534	

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
42	USDA/USAF	Evaluating the Next Generation of Family Maltreatment Prevention Training	09/01/13-8/31/14	$50,005	2012-39575-20317
43	DoD	Implementation Science Approaches in Implementing Severity Ratings of Partner and Child Maltreatment	09/01/13-8/31/14	$1,100,000 DC	2013-39578-21519
44	NIH	Does Coercive process play a role in adolescent dating violence?" (PIs: Lorber, Heyman, Slep)	07/01/14 – 06/30/16	$427,459 DC	R21HD077345
45	NIJ	Relationship Processes in the Development of Teen Dating Violence (PIs: Lorber, Heyman, Slep)	1/1/15-12/31/17	$800,000 DC	2014-VA-CX-0066
46	CDC	Research on the Efficacy and Feasibility of Essentials for Parenting Toddlers and Preschoolers	09/30/14-09/29/16	Subcontract Direct Costs: $90,492 DC	200-2014-59973
47	USDA/USAF	Improving Caseload Management in FAP and Mental Health: Phase 1	9/1/15-8/31/16	$145,666 DC	2015-39575-24367
48	NIH	Targeting Corrosive Couple Conflict and Parent-Child Coercion to Impact Health Behaviors & Regimen Adherence	10/1/15-9/30/18	$750,000 (DC)	1UH2DE025980-01
49	USDA/US Army	Army Family Advocacy Program Incident Determination Committee Testing and Evaluation	9/30/15-9/29/20	$1.8M (Year1 Total) $2.15M (Year 2 Total) $1.954M (Year 3 Total)	2015-48783-24394
50	USAF	"Up-armoring" at-risk military couples: A prospective study of committed romantic relationships in transition to their first permanent duty station (PI: Dr. Jeff Cigrang, Wright State U.; Subcontract PIs:	11/1/17–10/31/20	$368,853 (Year1 Total)	

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
		Heyman & Slep)			
51	NIJ	Longitudinal Cohort Study of Interpersonal Violence Among College-Aged Women and Men: Planning Phase	9/30/16-9/29/17	$101,762 (DC NYU's subcontract)	2016-MU-MU-K074
52	NIH	Supplement to "Targeting Corrosive Couple Conflict and Parent-Child Coercion to Impact Health Behaviors & Regimen Adherence"	07/01/2017-06/30/2018	$209,147 (Total)	1UH2DE025980-01
53	USDA/USAF	Improving Caseload Management in FAP and Mental Health: Phase 2	9/1/16-8/31/17	$170,533 (Total)	2012-39574-20264
54	USDA/USAF	Improving Caseload Management in FAP and Mental Health: Phase 3	9/1/17-8/31/19	$200,000	217-3957527343
55	DoD (U.S. Army Medical Research and Materiel Command)	Lesbian, Gay, and Bisexual Couples in the Military: A Post-DADT Examination of Relationship Health, Perceived Community Acceptance, and Mission Readiness	1/1/2019-12/31/2021	Subcontract: $662,211 (Total)	W81XWH1820027
56	DoD (Military Operational Med Joint Program Comm. 5)	"Up-armoring" at-risk military couples: A stepped approach to early intervention and strengthening of military families (PI: Lt. Col. Elizabeth Najera, Keelser AFB; Subcontract PIs: Heyman & Slep)	01/01/2019 - 12/31/2019	$812,385 (Total) $142,897 (Subaward)	
57	NIJ	Longitudinal Cohort Study of Interpersonal Violence Among College-Aged Women and Men: Planning Phase: Supplement		$48,506(DC NYU's subcontract)	2016-MU-MU-K074

	AGENCY	TITLE OF PROJECT	AWARD PERIOD	AMOUNT AWARDED	FUNDED (GRANT #)
58	USDA/USAF	Improving Caseload Management in FAP and Mental Health: Phase 4	9/1/19-8/31/21	$200,000	

Grants as Co-Investigator					
1	NSF	Shared novel/challenging activities and relationship quality: Testing key theoretical mechanisms and moderating variables in a large sample of returning combat soldiers (Heyman & Slep, Co-Investigators; PI: Arthur Aron)	05/01/09-04/30/10	$166,983	0937559
2	Congressionally Directed Med. Research Programs (DoD)	Individual and Relationship Factors Affecting Marriage Quality and Stability Across the Deployment Cycle: Psychological Health and Well-Being for Military Personnel and Families (Heyman & Slep, Co-Investigators; PI: Lt. Col. Jeff Cigrang)	10/01/10-09/30/2012	$481,000	D61_I_10 J5_100

Mentor for "Mentored Career Development Award"					
	American Cancer Society	"Caregiver relationship quality & communication in advanced cancer care" (PI: Maija Reblin, University of Utah)	7/01/2013-6/30/2017	$729,000	Awarded; ACS MRSG 13-234-01-PCSM

Mentor for Graduate Student Fellowships					
	NIH	Frontal Asymmetries And Interpersonal Anger, Aggression, And Inhibition Across Adulthood (PI: Jill Malik)	6/23/2010- 6/22/2013	$68,960	1F31AG037529-01
	American Psychological Foundation	“Influence of interparental conflict and parenting on children's social skills” — Elizabeth Munsterberg Koppitz Child Psychology Graduate Fellowship (PI: Nadia Samad, Stony Brook University)	9/1/2012-8/31/2013	$25,000	-