



OLD DOMINION
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Sex and Social Motives Moderating Effect on Prospective PBS Use After Drinking Intervention Boosters

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College Drinking and PBS Use

- Heavy alcohol use is prevalent among college students.
 - Of U.S. college students, 52% report past month drinking; 23% report past 2-week binge drinking (≥ 5 drinks in a row in the past 2-weeks; Patrick et al., 2025).
 - College students who binge drink are more likely to experience past-year negative consequences (e.g., blacking out, vomiting; 72% vs. 33%; Patrick et al., 2020).
- Protective behavioral strategies (PBS) are behaviors students can engage in to moderate their drinking or related consequences (Martens et al., 2009)
 - PBS use has been negatively associated with drinking-related outcomes (e.g., heavy alcohol use [Cox et al., 2024; Nogueira-Arjona et al., 2021; Zimmerman et al., 2024] and negative consequences [Carey et al., 2022; Cox et al., 2024; Montes et al., 2019]).
 - The promotion of PBS use is a common component of alcohol interventions



Online Interventions and Boosters

- Online alcohol interventions are commonly used by universities to address student drinking (Riordan & Carey, 2021).
 - Many interventions delivered to college students include content based on alcohol-relevant cognitions (e.g., drinking motives, normative perceptions; Carey et al., 2007; CollegeAIM, n.d.; Hennessy et al., 2019), social support [Neighbors et al., 2019], protective behavioral strategies [PBS; Reid & Carey, 2015].
 - Personalized normative feedback (PNF) is a common component of drinking interventions (Moreira et al., 2009; Neighbors et al., 2010; Neighbors et al., 2016).
 - Concerns about longevity of effects from online interventions.
 - Boosters are brief follow-ups designed to target the same content as the intervention.
 - Some boosters after online interventions have shown promise for extending effects (Braitman & Lau-Barraco, 2018), while others have shown limited success (Braitman et al., 2022).



The Original Study

- College drinkers ($N = 528$) completed a computer-delivered intervention, then were randomized into one of three groups:

Intervention-Only

- Only received the online intervention
(e-CHECKUP TO GO)

Intervention + PNF

- Received the online intervention
- Received a personalized normative feedback (PNF) booster

Intervention + PNF/PBS

- Received the online intervention
- Received a PNF and PBS feedback booster

- Boosters were emailed two weeks post-intervention
- Follow-up surveys were completed 1 month and 3 months post-intervention



The Original Study (cont.)

Baseline

- Surveys consisted of measures of alcohol-related behaviors (e.g., PBS use, typical alcohol use), cognitions (e.g., drinking motives), social influences, and demographics (e.g., sex).
 - PBS use: the modified Strategies Questionnaire (Braitman, Henson, & Carey, 2015; Sugarman & Carey, 2007)
 - Drinking motives: Drinking Motives Questionnaire (DMQ; Cooper, 1994)
 - Enhancement, Social, Conformity, Coping

Boosters

- Two types of boosters: 1) PNF only; 2) PNF & PBS

Follow-Up Surveys

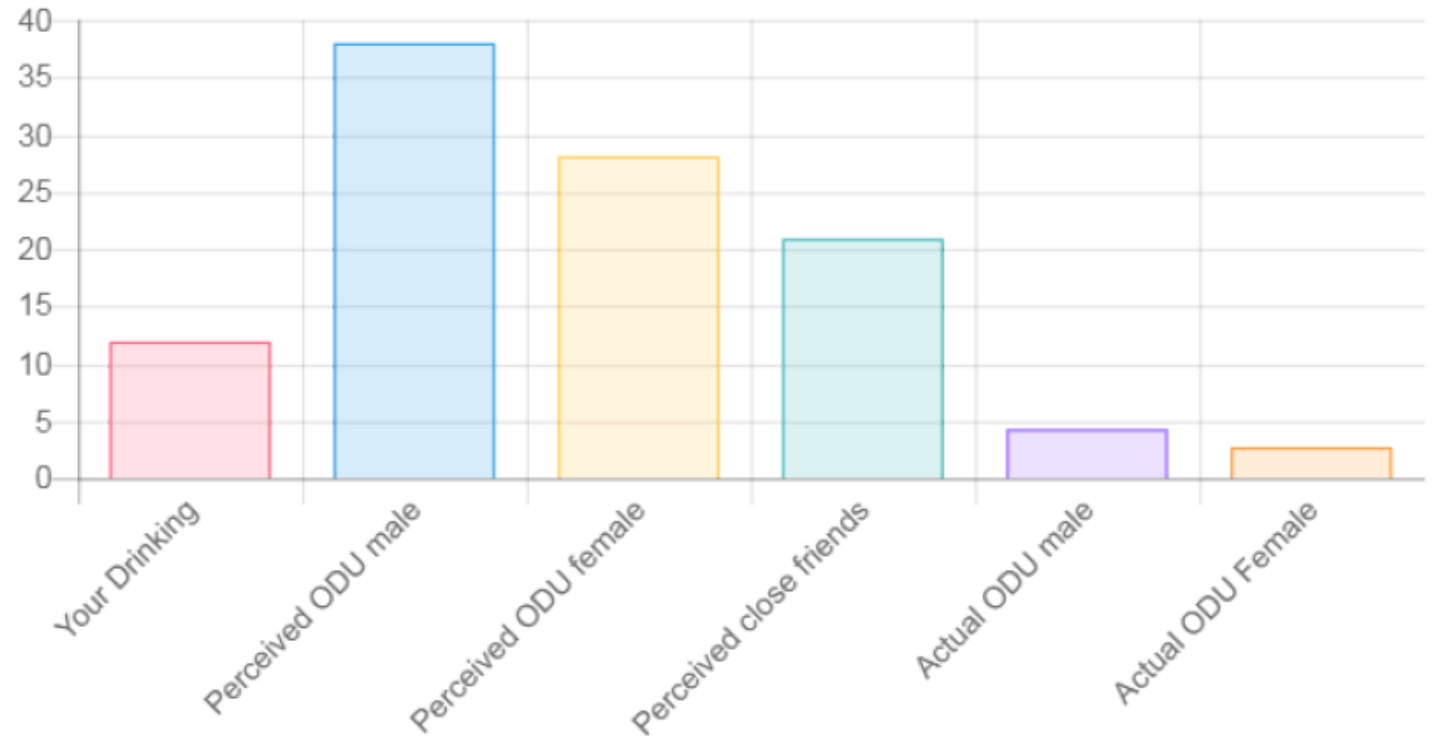
- Follow-up surveys were administered one month and three months after baseline data was collected.
- Follow-up surveys consisted of alcohol-related measures and feedback items about the intervention and boosters.

Booster Emails

PNF only

- Tailored based on their baseline survey data
- Addresses normative misperceptions

First, I just wanted to let you know how you compare to other ODU students.



You reported drinking 12 drinks in a typical week.

You estimated the typical male ODU student drinks 38 drinks in a typical week.

You estimated the typical female ODU student drinks 28 drinks in a typical week.

You estimated your close friends drink 21 drinks in a typical week.

According to students surveyed...

The typical male ODU student actually drinks 4.3 drinks per week.

The typical female ODU student actually drinks 2.8 drinks per week.





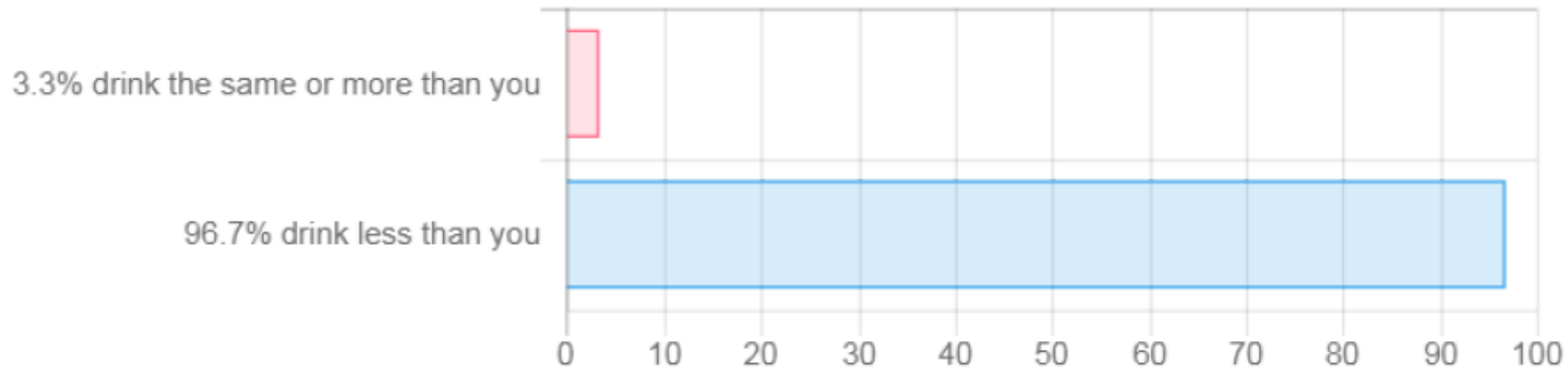
Booster Emails

- PNF included engaging graphics
- Information shared in a compelling way

Your percentile rank...

Compared to other Female ODU students, your percentile rank is 96.7%.

That means that only 3.3% of Female ODU students drink as many or more drinks per week than you.





Booster Emails

I noticed that you reported using the following strategies to control your drinking:

PNF & PBS

- Harm reduction strategies (PBS)
- Tailored to identify those strategies used vs not

- Choose to avoid situations where heavy drinking is likely
- Choose to participate in enjoyable activities that do not include alcohol consumption
- Finding other ways besides drinking to reduce stress
- Practicing ways to be more comfortable in social settings without using alcohol
- Being prepared with effective coping strategies in situations where you think heavy drinking is likely
- Drinking slowly
- Spacing drinks over time
- Eating before and while you are drinking
- Alternating alcoholic and nonalcoholic beverages when you are drinking
- Choose not to participate in drinking games when given the opportunity
- Refusing drinks
- Being aware of internal body sensations that indicate you are getting intoxicated
- Drinking beer with a lower alcohol content (light beer) instead of stronger alcoholic beverages
- Choose not to "pre-game" or "pre-bar" (i.e., drinking before going out)
- Engage in activities while drinking to space out drinks (e.g., dancing, playing pool, darts)
- Limit drinking to certain days of the week

Great job! But don't forget some of the other strategies you can use to reduce your drinking and minimize harm:

- Limiting cash before going out to drink
- Avoiding carrying credit cards or ATM cards when going out to drink
- Keeping track of how many drinks you have
- Choose not to do shots when available
- Choose not to funnel, shotgun beers, or do keg stands when those activities are available

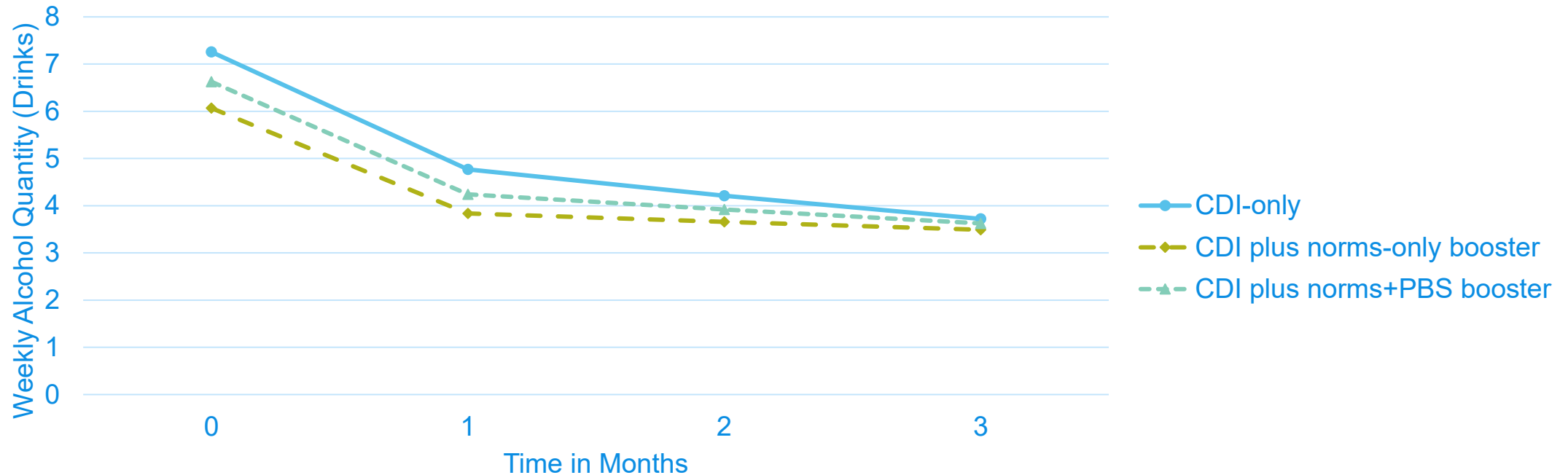
Let me know if you have any questions, and take care!

Abby, Your Personal Research Coordinator



Original Findings

- LGMs including two slopes (one for immediate post-intervention change and one for longer-term maintenance) were fitted on drinking quantity and likelihood of alcohol-related problems



- The online intervention was highly efficacious, resulting in strong reductions across condition through the 3-month follow-up, suggesting strong maintenance of CDI effects (Braitman et al., 2022)
- Not moderated by baseline levels of PBS use



The Current Examination



Current Examination

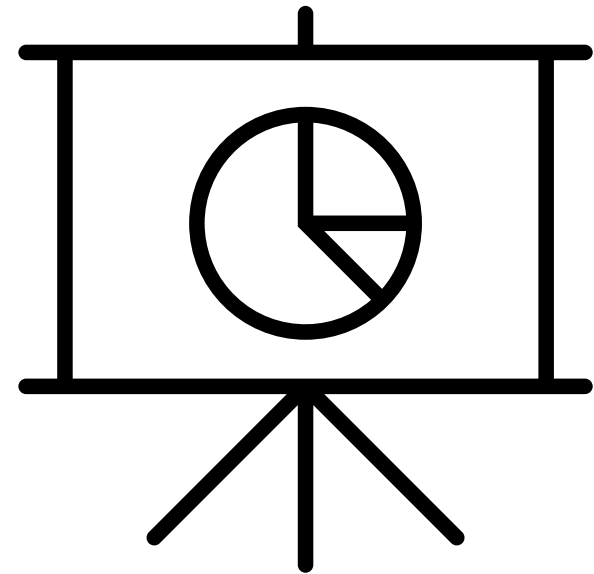
- Secondary data analysis of data
- Looking at **PBS use** as the outcome

- Interested in potential moderators for prospective PBS use and booster type
 - Exploring moderators of sex and drinking motives



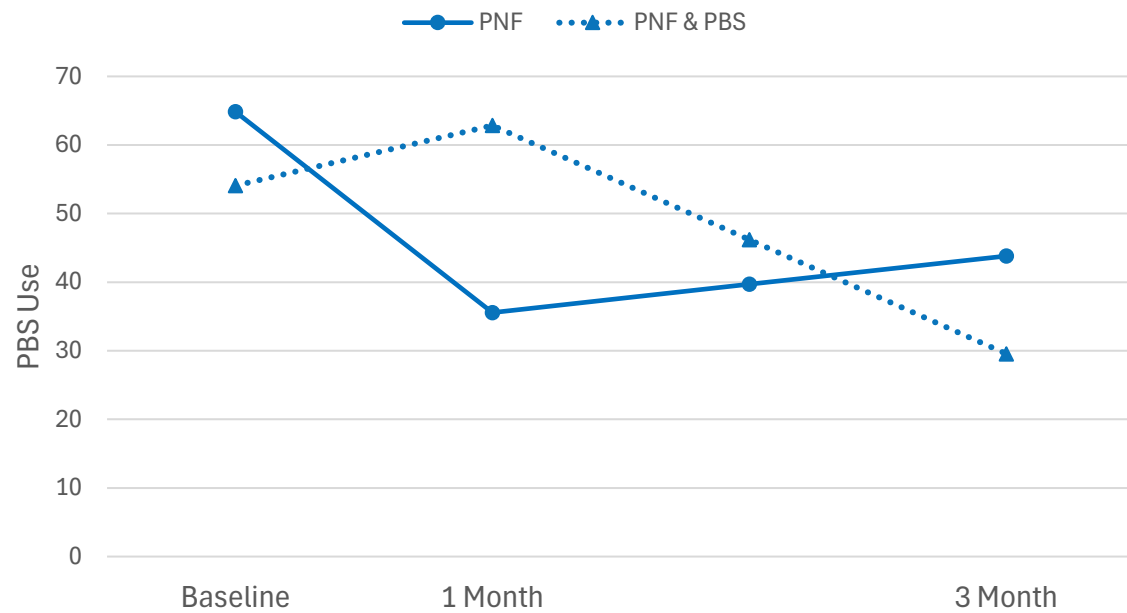
Analysis Approach

- Latent growth modeling (Mplus v. 8.7) with two piecewise slopes
 - Initial change at 1 month
 - Longer-term change over 3 months
- Intercept and slopes regressed onto moderators and their interaction with condition

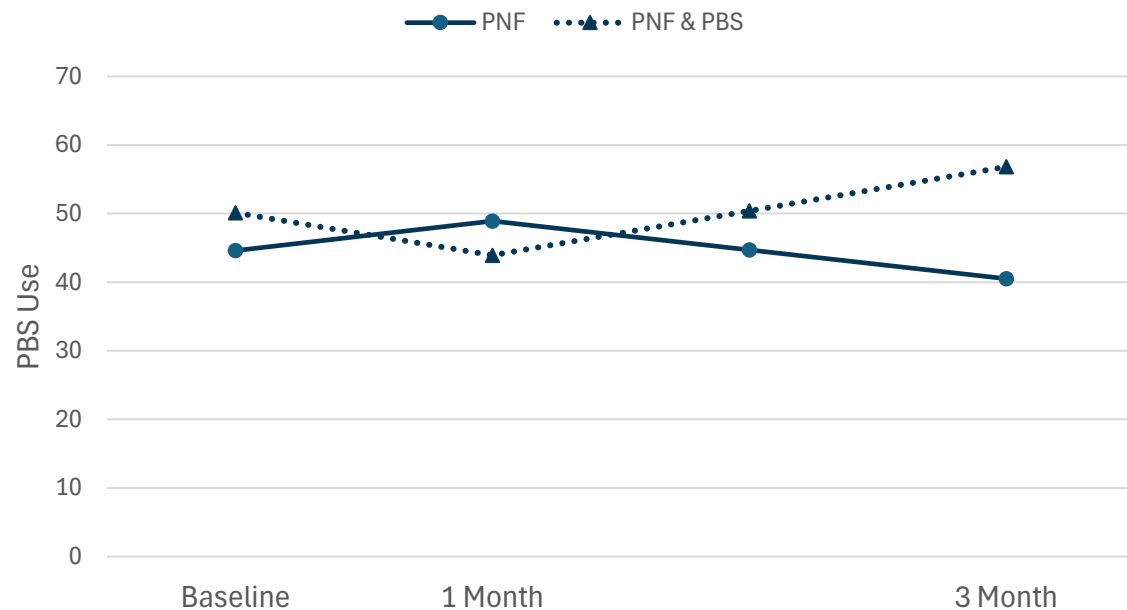




PBS Moderation - Female



PBS Moderation - Male



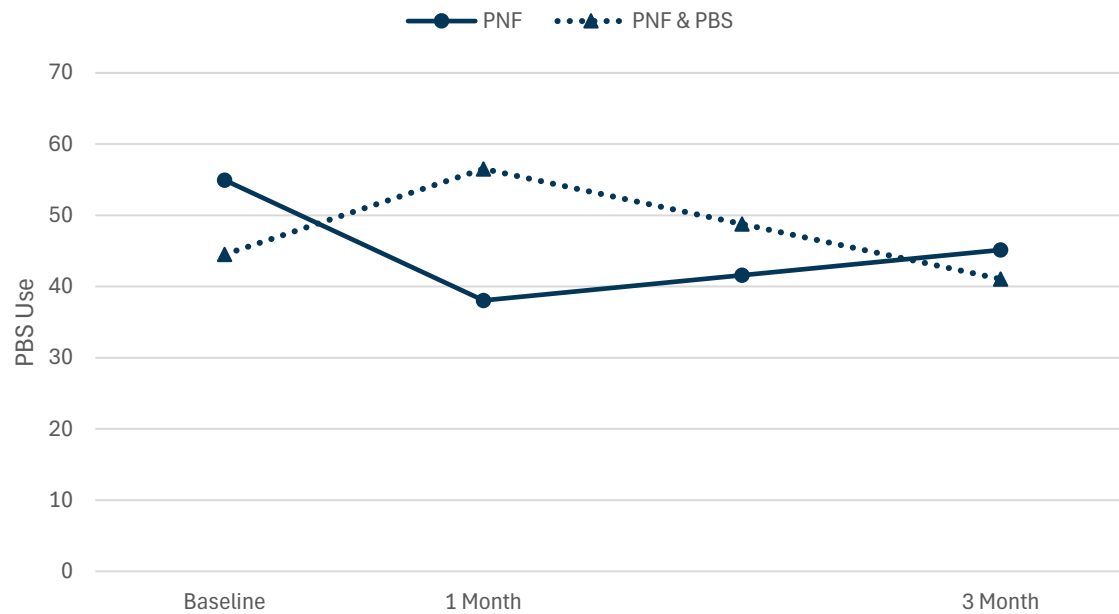
Results

Sex

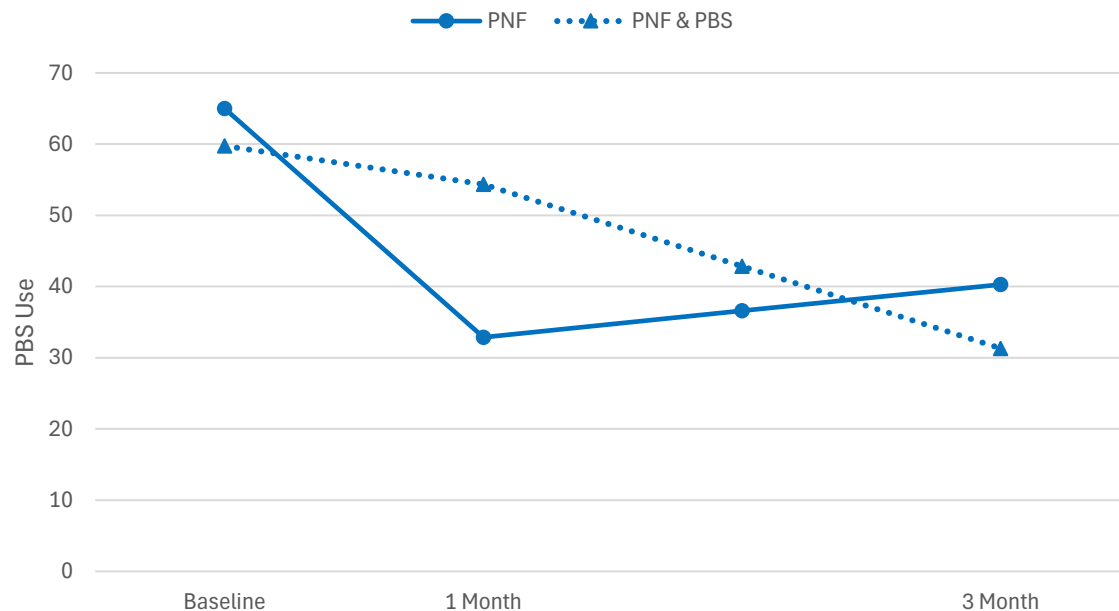
- Moderated the relationship for both slopes
- Female participants who received PNF-only boosters reduced PBS use 1 month post-intervention, whereas those who received PBS feedback actually increased
- Male participants who received PBS feedback increased their PBS use through 3 months



PBS Moderation - High Social Motives



PBS Moderation - Low Social Motives



Results

Drinking Motives

- Social motives were the only motive to moderate the condition effect
- PNF-only reduction in PBS use was most pronounced for students with low social drinking motives
 - Those receiving PBS feedback only increased their PBS use if they had high social motives
 - Individuals with low social motives had a less pronounced decline or stayed relatively steady if they received PBS feedback



Implications

- PBS use declined for intervention recipients who reduced their drinking
 - This decline can be avoided or mitigated by providing PBS-specific feedback
- PBS content included in post-intervention boosters more strongly impacts female college students
- High social motives for drinking may be a protective factor in continued PBS use directly after intervention boosters



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National Institute
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and Alcoholism



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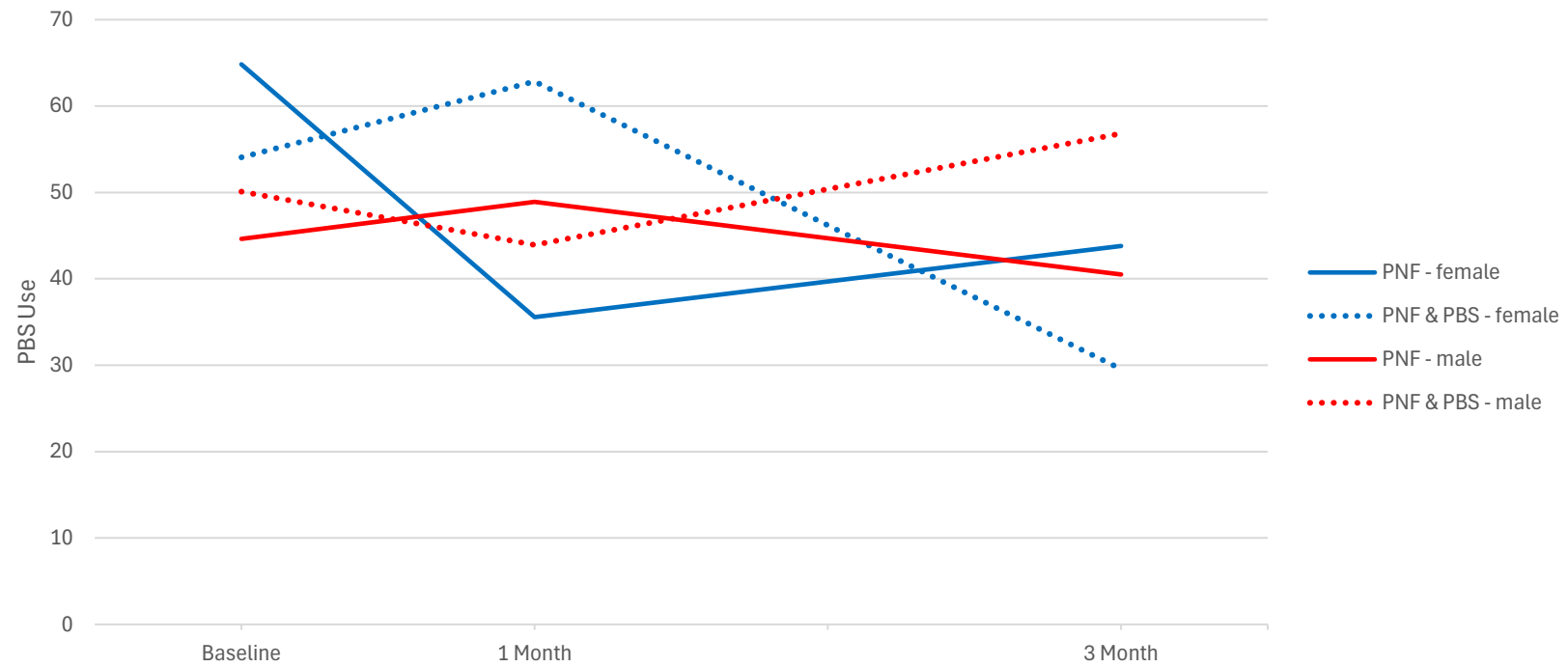


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PBS Moderation - Sex





PBS Moderation - Social Motives

