

Brief mailed tailored feedback can produce long-term alcohol risk reduction: Two-year results from the PARR trial

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Presented at the Annual Meeting of the American Public Health Association,
Boston MA, November 6, 2006

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ABSTRACT

The Population Alcohol Risk Reduction Study (PARR) is a randomized population based trial of a brief intervention involving a series of three individually tailored computer generated feedback reports for alcohol risk reduction mailed over a six month period to nondependent 'at risk' drinkers proactively recruited from the active membership of a managed care organization. Over 11,000 MCO members were screened for 'at-risk' drinking; exceeding the NIAAA Physician recommended weekly intake levels (14/7 drinks), or reported heavy episodic "binge" drinking in the last month. Sample characteristics: 51% male, 89% white; [M(std)] age 42.8(12.7), BMI 25.8(4.5), alcohol drinks/week 8.4(9.0), "binge" episodes/mo: 1.9(3.4), and AUDIT score 5.9(3.3). Data for this paper is from 6 waves of assessment for 868 participants randomized to intervention or assessment-matched control groups. Two-year intervention effects on primary drinking outcomes are presented. GEE and random coefficient regression model results show consistent treatment group reductions in alcohol use across multiple indicators over time. Significant treatment group reductions on number of drinks/week, and number of at-risk alcohol behaviors were seen at the 6, 12 and 18 month assessments. Reductions in frequency of binge drinking, peak (30 day max) drinks, and alcohol "at-risk status" (0,1) were seen at all time points, although were significantly different from controls only at 12 month assessment. This study demonstrates that low-cost brief computer generated feedback has the potential for important public health impact by reducing high risk alcohol use among the large segment of at risk drinkers who typically do not receive intervention for risky alcohol use.

Purpose

Present the two-year results from the Population Alcohol Risk Reduction Study (PARR), a randomized trial of brief motivationally matched feedback delivered by mail to “at-risk” drinkers recruited from a managed care organization.

This study compares the results of two experimental conditions:

Brief feedback Intervention (Treatment group)

Assessment matched (Control group)

PARR Recruitment and Retention

Step 1: Screen MCO membership for Eligibility

20,913 Members Contacted (68% of MCO List)

11,337 Complete Eligibility Survey (54%)

82% Screened Out (n=9,273)

10% Eligibility Undetermined

35% Refuse (n= 7401) (50% of refusers use refusal form)

18% Eligible (n= 2,115) for PARR Survey

Step 2. Baseline Recruitment

1,450 Completed Baseline Survey (74%)

6% Screened Out (ineligible at baseline)

17% Refuse Baseline Survey
(~50% return refusal form)

3% Eligibility Undetermined
(partial or in complete)

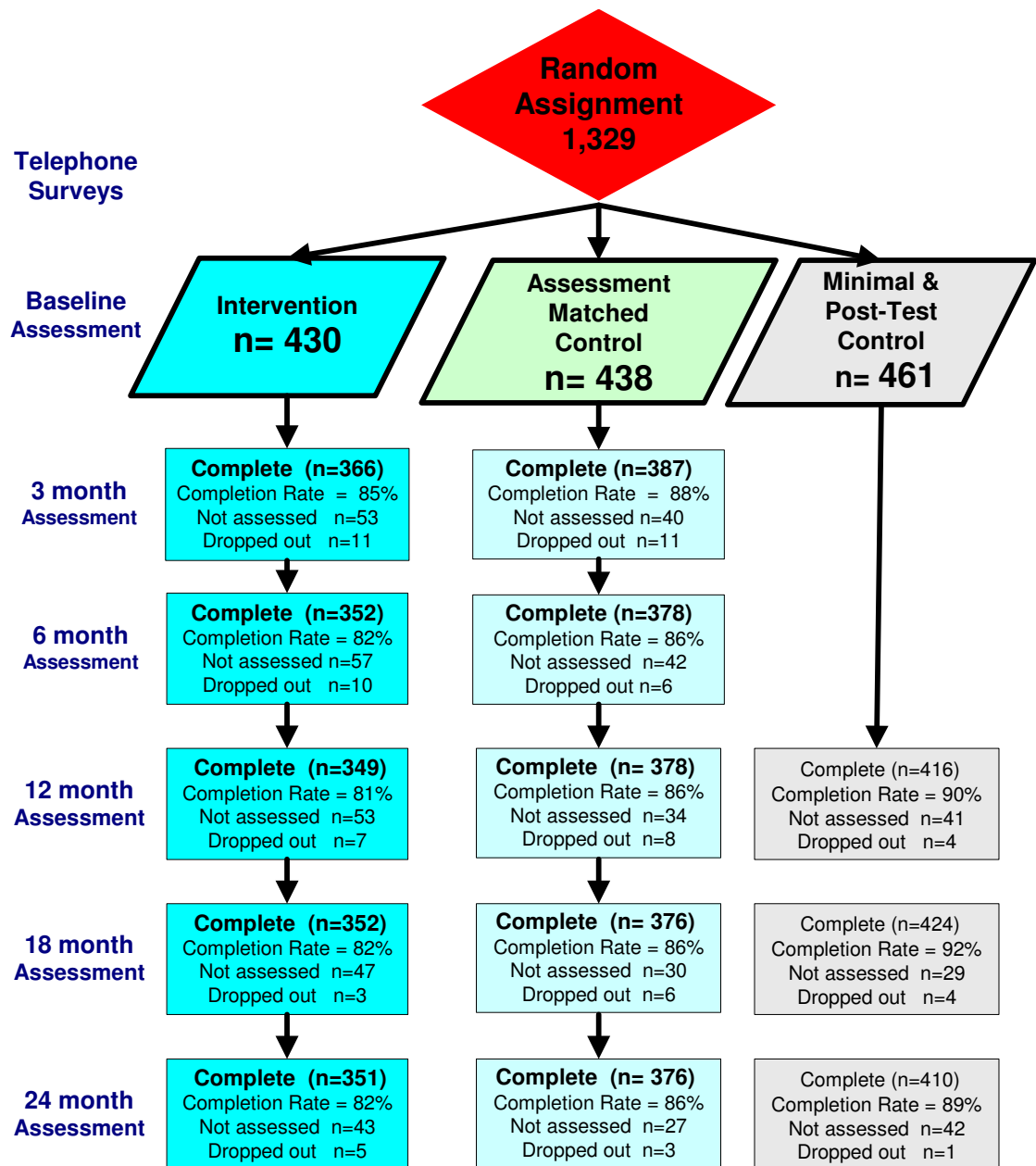
67% Participation Rate (n=1,329)
(randomized into 3 groups)

Telephone follow-up Assessments

84% retention at 12 months

87% retention at 12 months

86% retention at 12 months



Alcohol “At-Risk” Eligibility

1. **MCO Member** for at least 1 year.
2. **Age** \geq 21 years.
3. **Exceeds NIAAA Physician Guidelines for Immoderate or “At-Risk” Drinking:**
 - Exceeds recommended maximum weekly volume
 - Females >7 drinks; Males >14 drinks males.
 - Any Heavy Episodic (Binge) occasions in past month
 - Females >4 drinks, Males >5 drinks
4. **Negative history of substance abuse, treatment or dependence**
 - No prior substance abuse treatment, or referral for treatment prior to screening
 - Does not demonstrate clear signs of alcohol dependence (ADS >20).

Methods

PARTICIPANTS

- Were screened for eligibility as immoderate or “at-risk” drinkers from the active membership of a managed care organization. (Tables 1 & 2)

DATA

- Six waves of data from 868 participants randomized to intervention or assessment-matched control conditions analyzed.
 - Post-test Control group not included in these analyses
- Data include telephone survey assessments at baseline, 3 and 6 months (the intervention period assessments) and the 3 outcome assessments at 12 months, 18 months and 24 months(12 months post-intervention).
 - High retention rates

ANALYSIS OF INTERVENTION EFFECTS

- Random coefficient regression models used for each continuous outcome measure.
 - Models for fixed effects were: $Y = \text{Time} + \text{Treatment Group} + \text{Treatment Group} * \text{Time}$
 - Best fitting models had significant random effects for Intercept, Time and Time^2 , as determined by comparison of deviance statistics (LLR tests).
- GEE longitudinal regression with logit link function used to evaluate group change over time in the binary measure “Alcohol Risk” Status.
- All available case data analysis methods correct for potential bias due to missing data related to model terms under the missing at random assumption.

Table 1: Sample Characteristics

	N	%	Alcohol Use			
			Binge Episodes	Binge %	Drinks Per Week	Peak Per Mo.
Gender						
Male	655	49%	2.23*	65%*	10.5*	6.24*
Female	674	51%	1.49	55%	6.43	4.17
Marital status						
Married	826	63%	1.62*	54%	8.2*5	4.89*
Widowed	21	2%	2.52	48%	11.14	4.38
Divorced	73	6%	2.12	62%	9.63	4.82
Other	399	30%	2.28	72%	8.56	5.99
Race						
Black	49	4%	1.22	51%	6.55	4.49
White	1,171	89%	1.88	60%	8.61	5.22
other	92	7%	2.07	64%	7.60	5.50
Hispanic	54	4%	1.43	57%	6.67	5.02
Smoker						
No	1,043	79%	1.59*	56%	7.96*	4.85*
Yes	284	21%	2.82	73%	10.15	6.48
Education						
Less than HS	9	<1%	1.78	56%	9.11	4.89
HS or GED	192	15%	2.36	61%	8.90	5.72
College or more	1,119	85%	1.78	60%	8.39	5.13

* P<.05

Table 2: Baseline Equivalence on Primary Outcomes

	<u>Experimental Groups</u>			<u>F</u>	<u>p value</u>
	<u>Intervention</u>	<u>Assessment</u>	<u>Post-Test</u>		
DRINKING BEHAVIORS					
Drinking Days/wk.	3.24	3.28	3.32	0.14	.870
Drinks/Drink Day (DDD)	2.69	2.79	2.66	0.60	.550
Weekend DDD	3.26	3.44	3.21	1.00	.373
‘Binge’ Episodes/mo.	1.86	1.87	1.83	0.02	.981
Peak Drinks/last mo.	5.18	5.31	5.09	0.42	.662
PROBLEM MEASURES					
AUDIT Score	5.98	6.15	5.64	2.68	.069
SIP-2R Score	1.99	1.94	1.25	9.00	<.001
				$T_{(I,A)}=0.05$.962
Behav. Risk & Conseq. (past 3 months)	2.62	2.56	2.16	F=5.73	<.003
				$T_{(I,A)}=0.38$.704
(N)	(430)	(438)	(461)		



Brief Tailored Feedback Reports

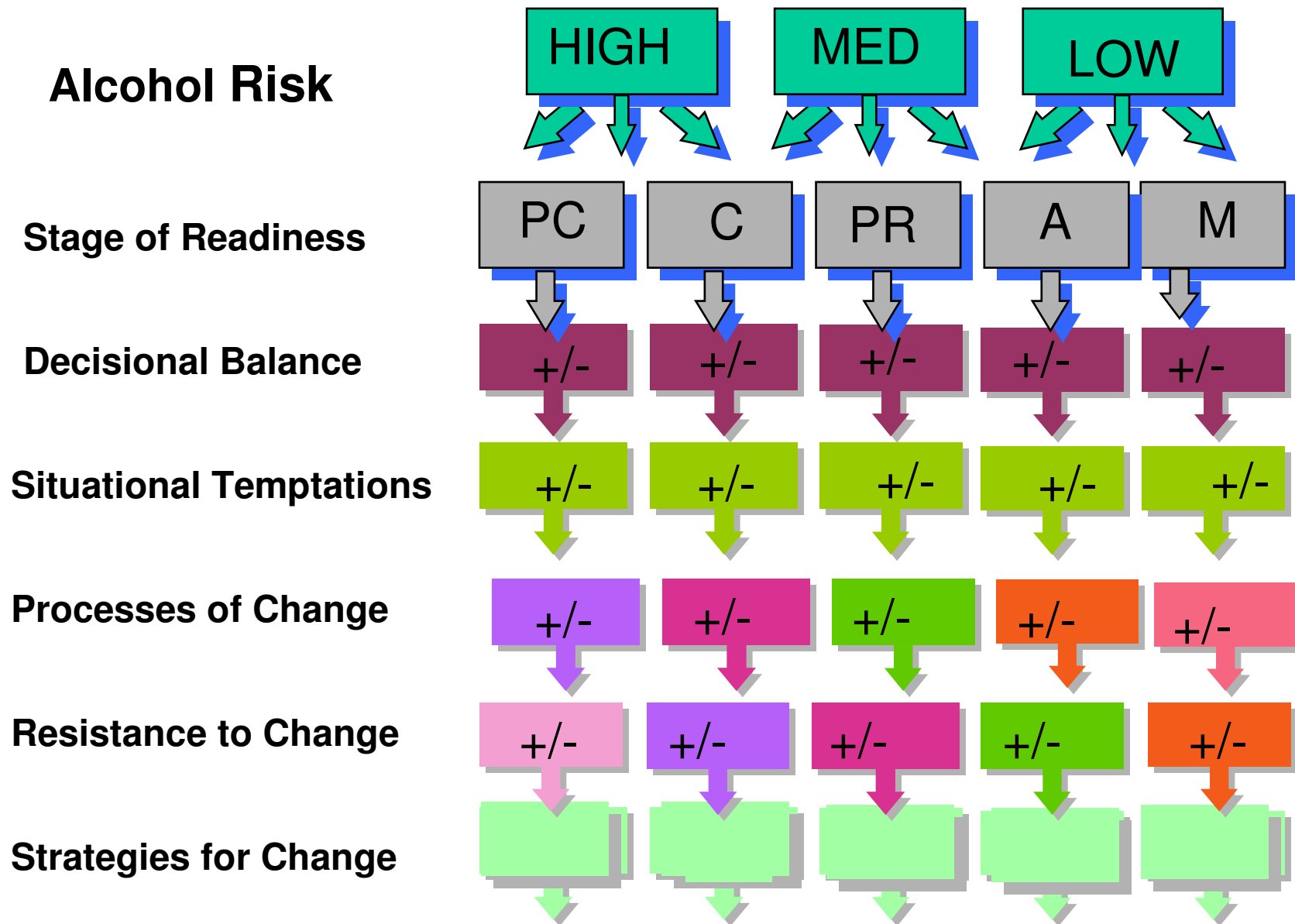


Computer generated from survey data collected at Baseline, 3 & 6 months post-baseline.

- 4 to 9 pages in length.
- Delivered to home by mail
- Feedback reports are multi-dimensional in content including:
 - Motivationally matched tailored feedback
 - Non-confrontational and informative in tone
 - Feedback on drinking risk behaviors and negative consequences
 - Accurate normative information, and comparison of personal drinking to the actual population norms
 - Advice/information regarding drinking reduction techniques, depending on motivational readiness



Tailored Multi-dimensional Feedback Reports



Outcome Measures

Alcohol Use

- **“BINGE” episodes** – Frequency of heavy drinking* episodes during past month, *(Log transformed)*
* heavy drinking episodes is defined as >3 females, >4 males drinks per occasion
- **Drinking Days** – Number of drinking days in a typical week (Frequency)
- **Average Drinks** – Typical number of Drinks/drinking day (Quantity), *(Log transformed)*
- **Drinks per week** – Average number; Quantity X Frequency = *(Log transformed)*
- **Peak Drinks** – Highest number of drinks on one occasion in past month. *(Log transformed)*

Composite Alcohol Risk Measures

Number of Alcohol Risk Behaviors – Past month count of four independent high risk behavior measures

1. Exceeds recommended maximum weekly volume limit for “moderate drinking” of 7 for females , or 14 for males
2. Past month self-reported binge episodes > 0, gender specific criteria.
3. Any reported gender specific average drinks per day >3, or >4;
4. Gender specific peak drinks >3, or >4;

Alcohol Risk Behavior Index Linear composite score of Binge episodes + average number of drinks per day and + peak drinks. *(Log transformed)*.

Alcohol Risk Status – exhibits either or both of the following.

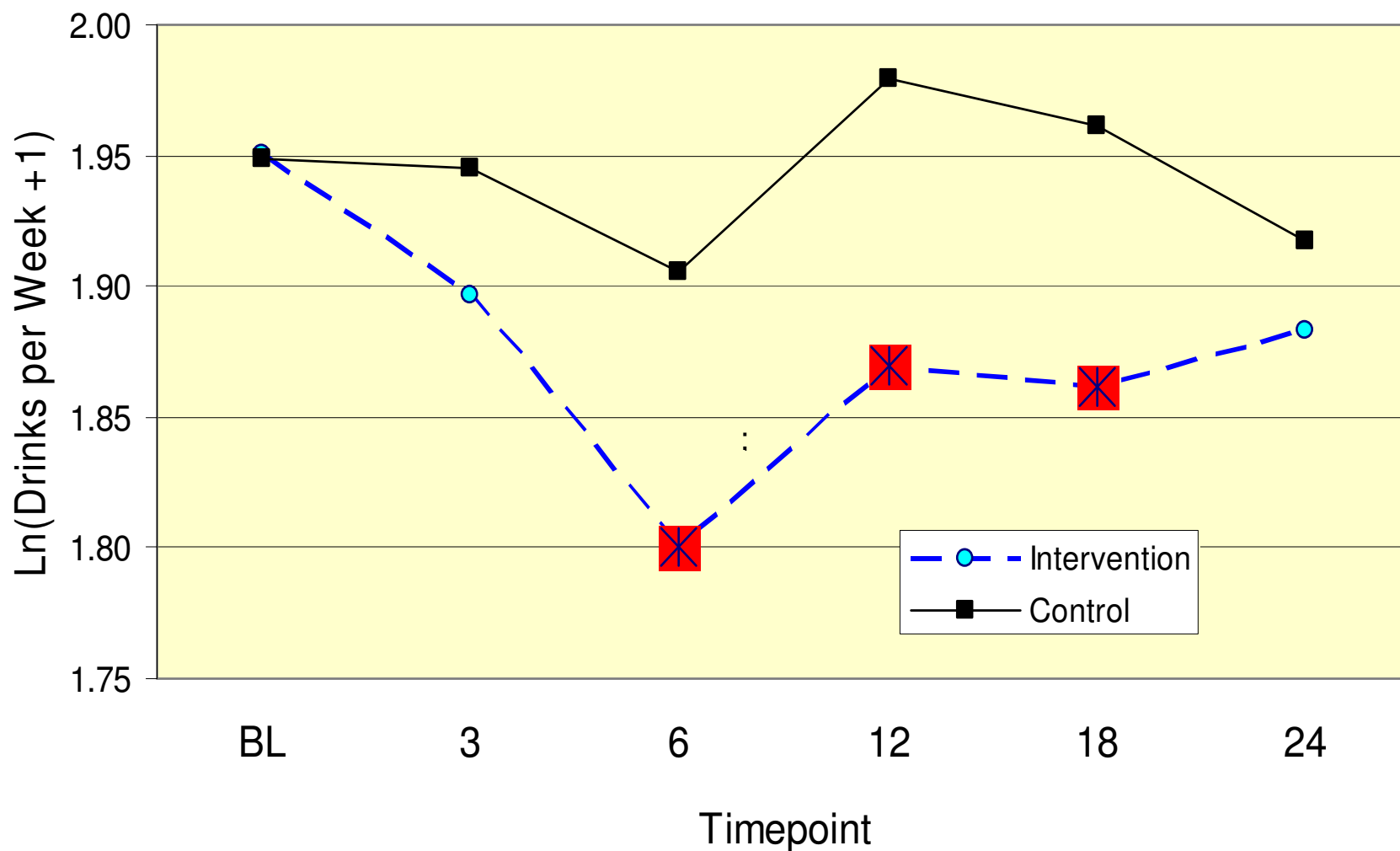
1. Exceeds recommended maximum weekly volume limit for “moderate drinking” (Females 7 drinks; Males >14 drinks males)

Results Summary

- Intervention group decreased alcohol use and alcohol risks compared to assessment matched controls (Table 3 and Figures 1-4.)
 - Findings are consistent across multiple measures
- Intervention effects lasted from 6 to 12 months after delivery of the final brief feedback intervention report at 6 months.
 - Consistent and significant decreases in the number of alcohol risk behaviors, and reductions of 9 to 11 % in drinks per week up to one year post-intervention.
 - 33% decrease in “At-Risk” alcohol status (RR=0.67; 95% CI 0.48, 0.94) at the 1st outcome assessment at 12 months. (see Figure 3)
 - Significant reductions in the frequency of heavy episodic “binge” drinking, number of alcohol risk behaviors, peak drinks and drinking days per week at the 1st outcome assessment (12 months post-baseline).
 - Strong secular trends observed in Peak drinks and Drinking days/week, suggests possible assessment effects (data not shown).

Figure 4:

Drinks per week Random Coefficient Model Estimates



TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2834)} = 2.04, p = 0.0702$


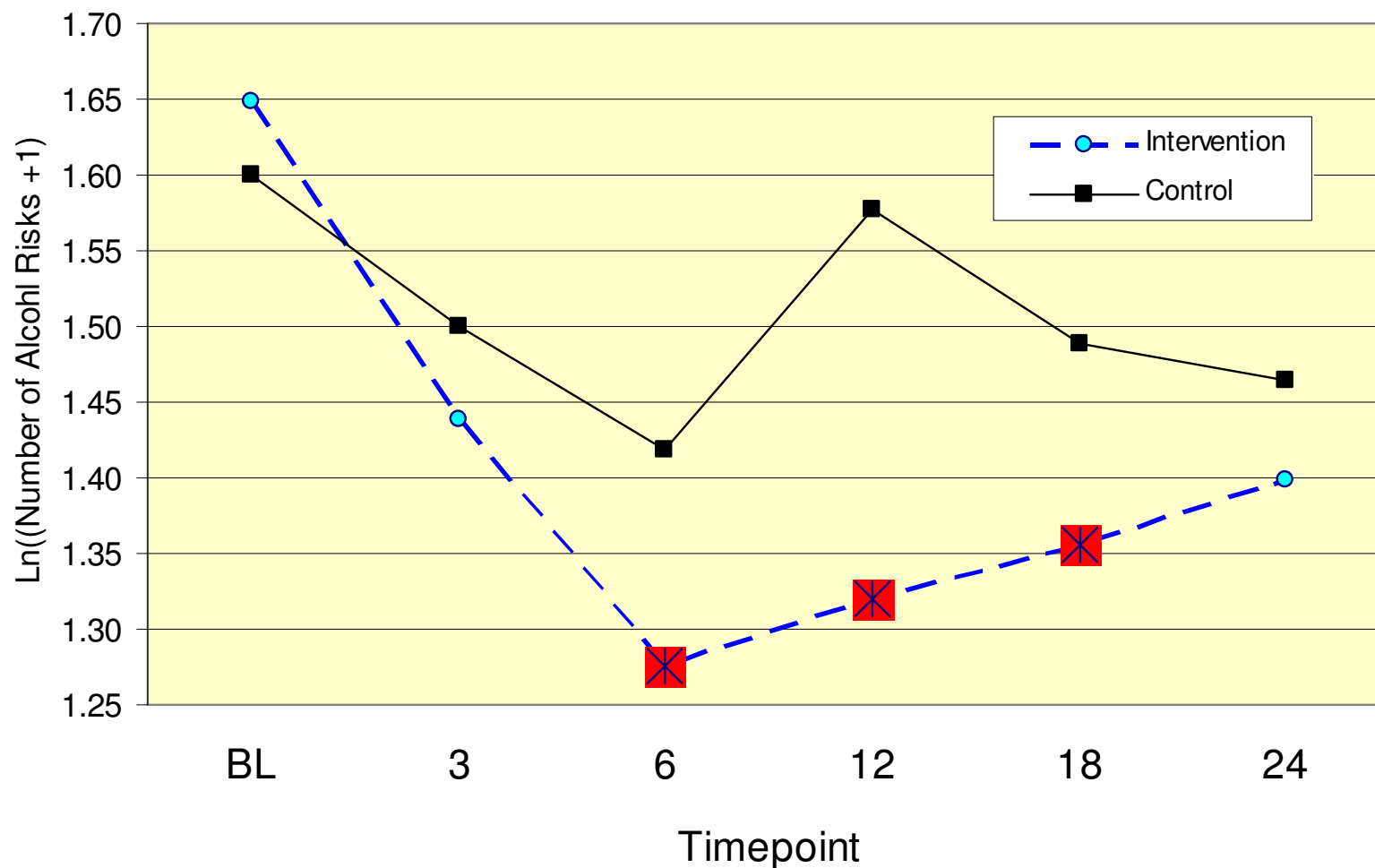
 $p < .05$ at Timepoint

Figure 1:

Number of Alcohol Risk Behaviors

Random Coefficient Model Estimates



TYPE 3 test of Time*Group fixed effect.: $F_{(df=5, 2843)} = 2.84, p = 0.0147$


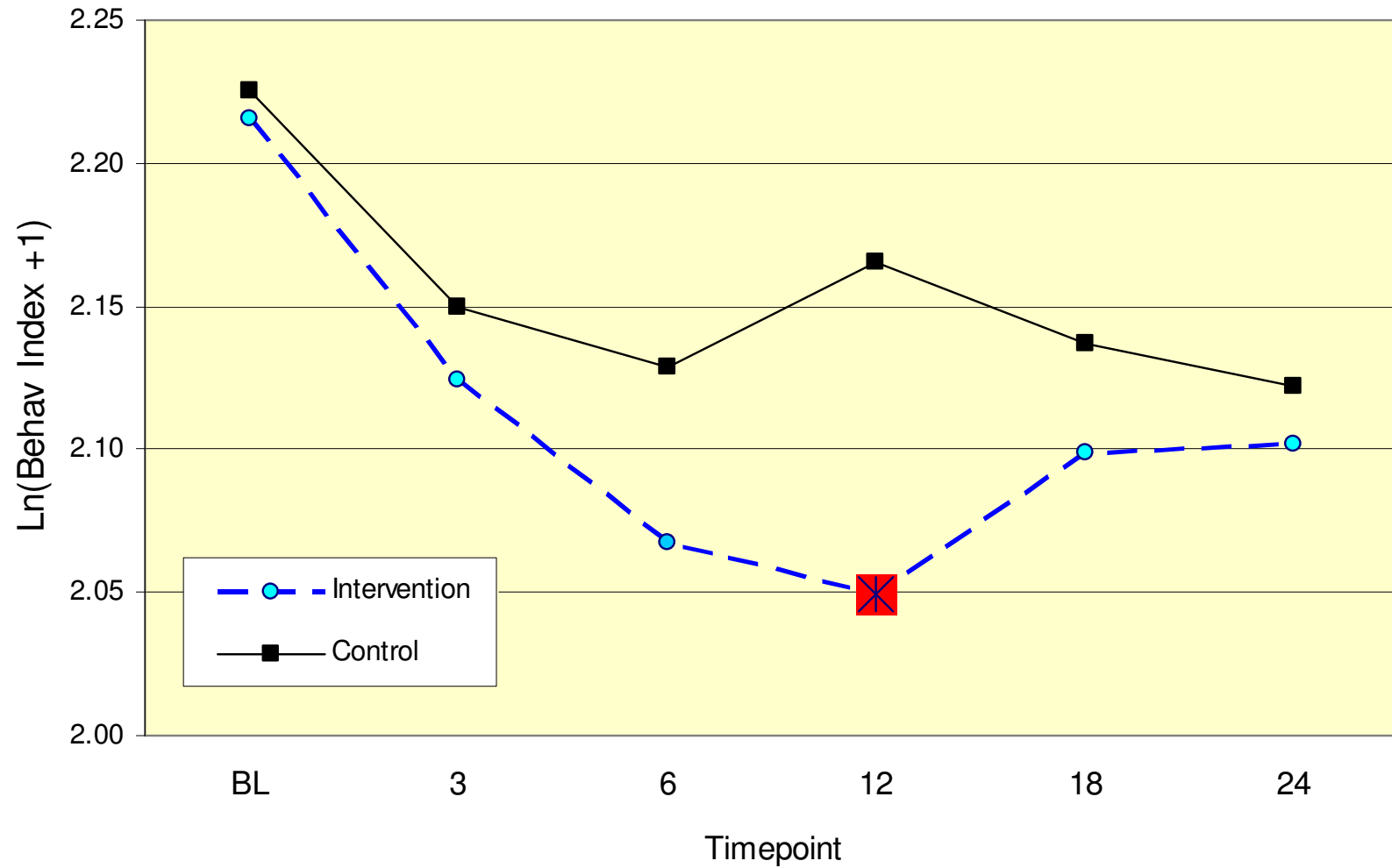
 $p < .05$ at Timepoint


Figure 2:

Alcohol Risk Behavior Index

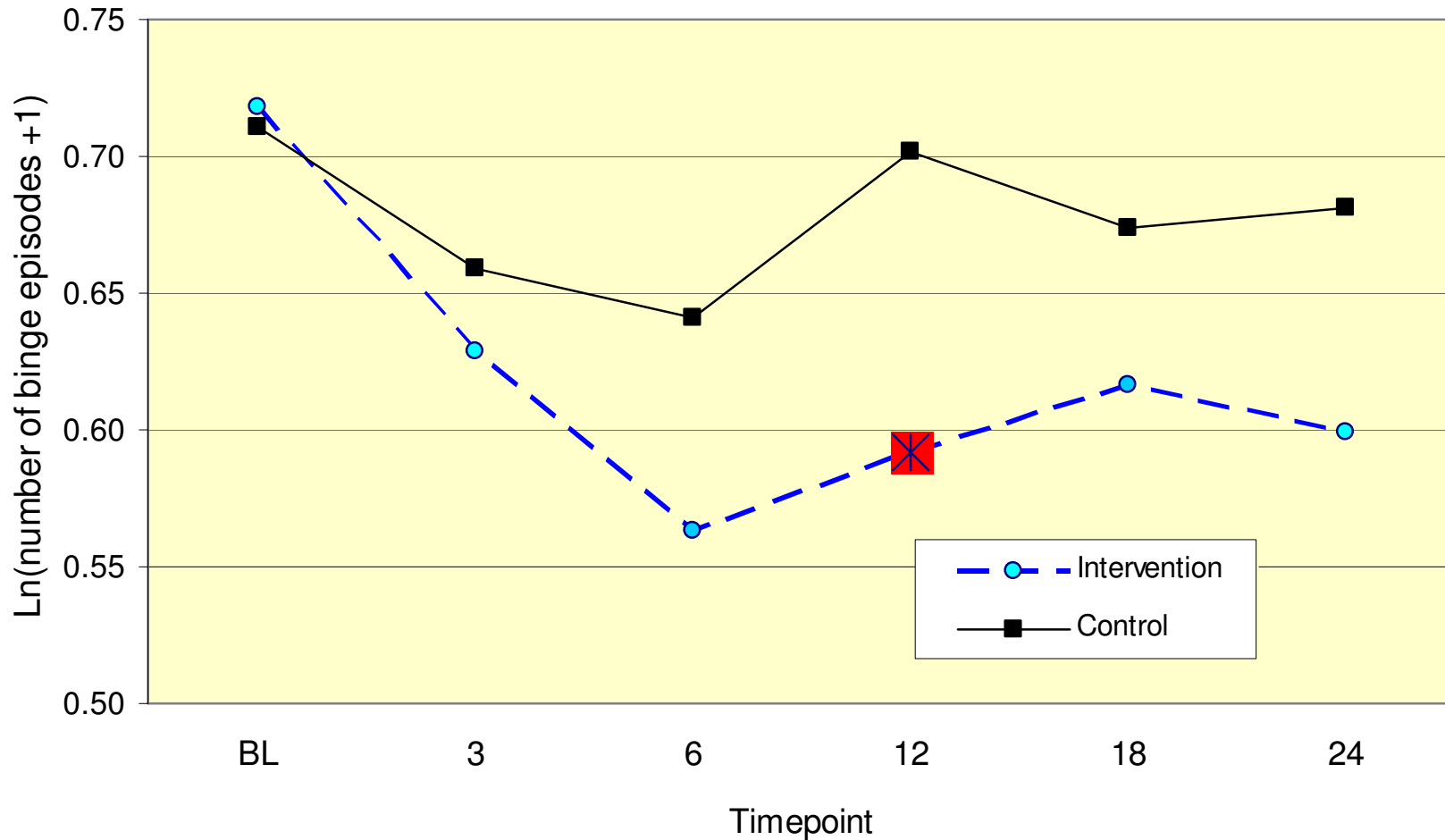
Random Coefficient Model Estimates




TYPE 3 test of Time*Group fixed effect: : $F_{(df=5, 2843)} = 2.23, p = 0.0484$

 $p < .05$ at Timepoint ;

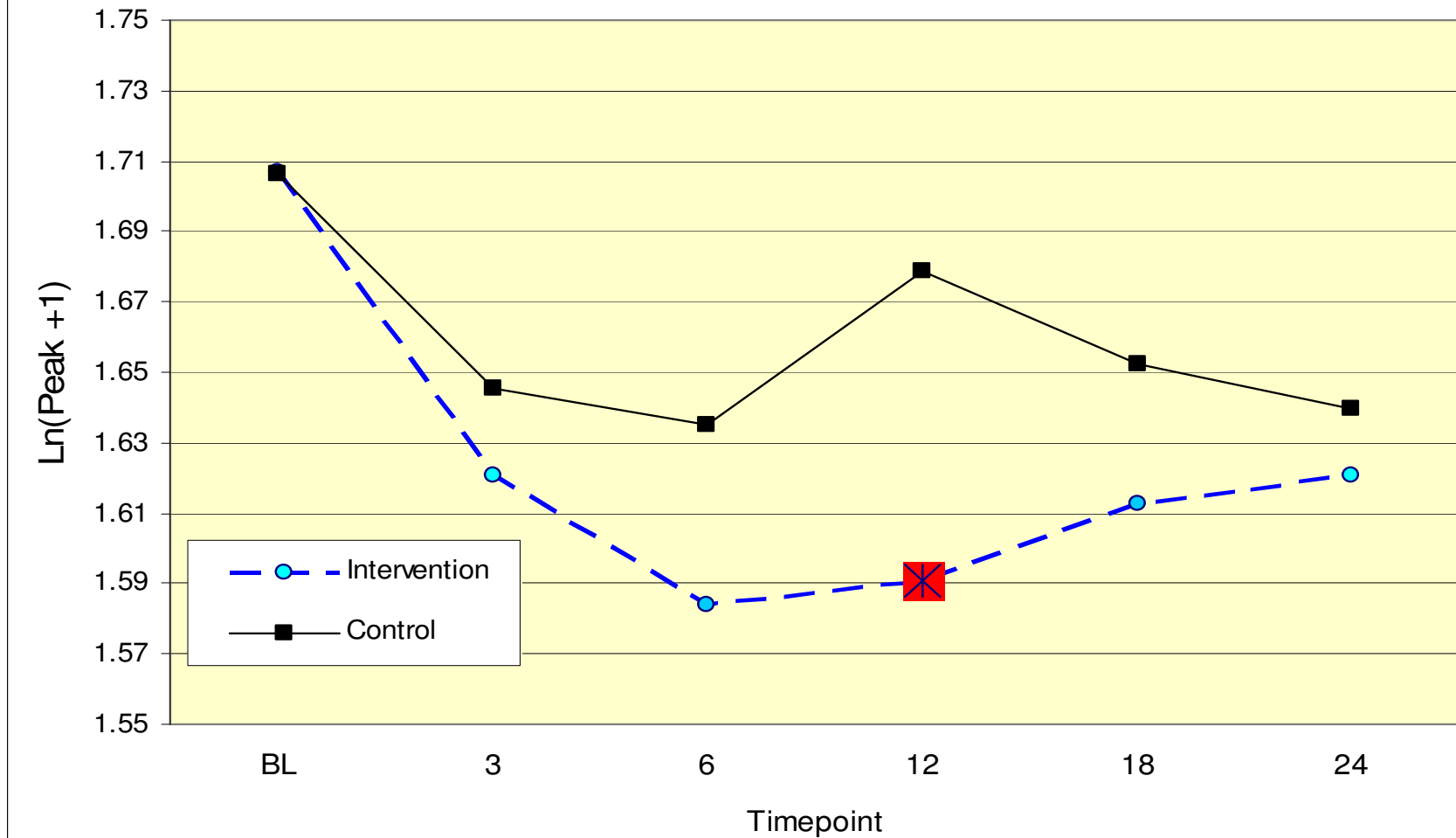
Binge Episodes (ln) by Intervention Group Random Coefficient Model Estimates




TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2804)} = 1.47, p = 0.1964$

 $p < .05$ at Timepoint

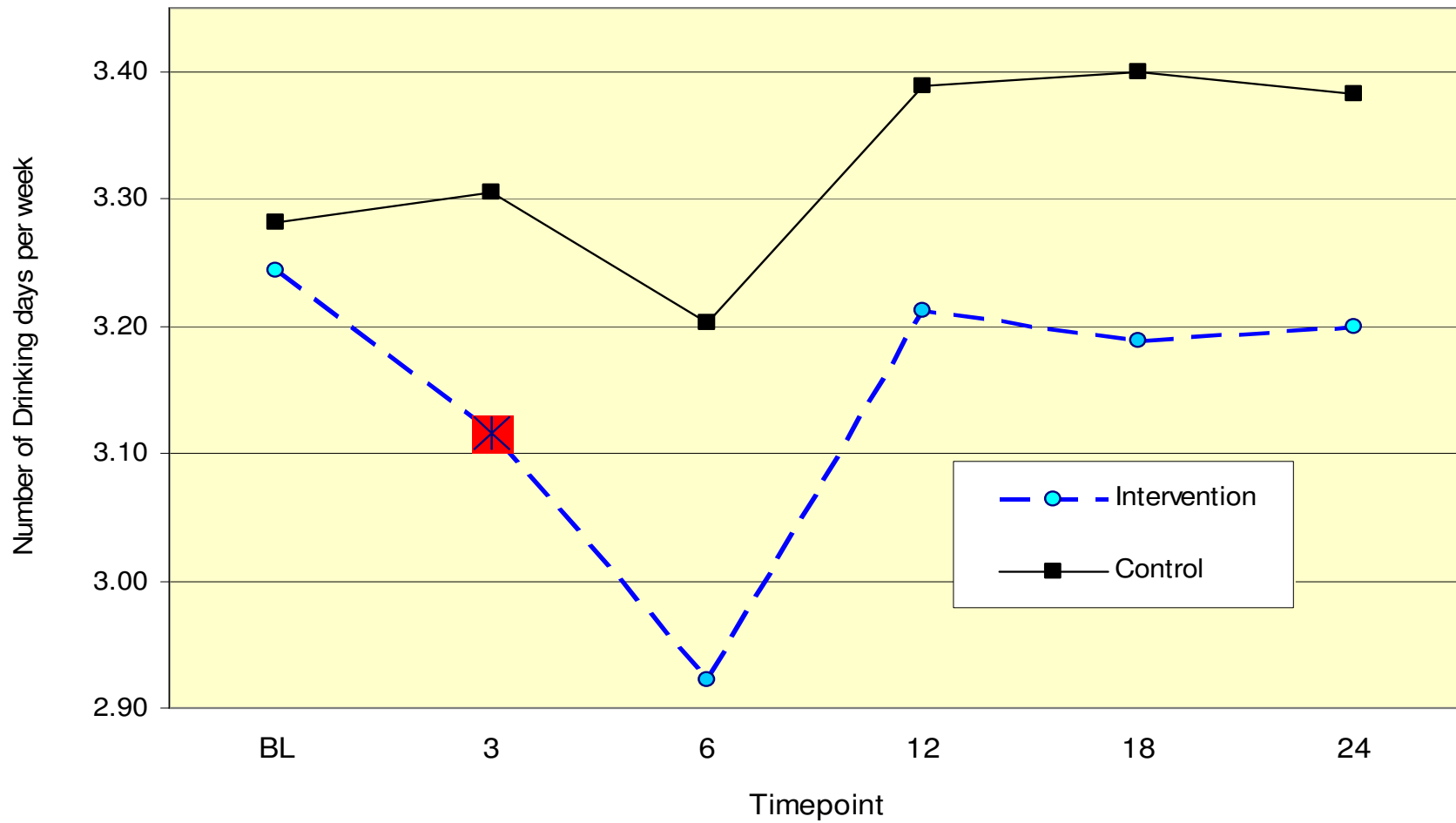
Peak drinks in past month (ln) by Intervention Group Random Coefficient Model Estimates




TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2836)} = 1.65, p = 0.1439$

 $p < .05$ at Timepoint

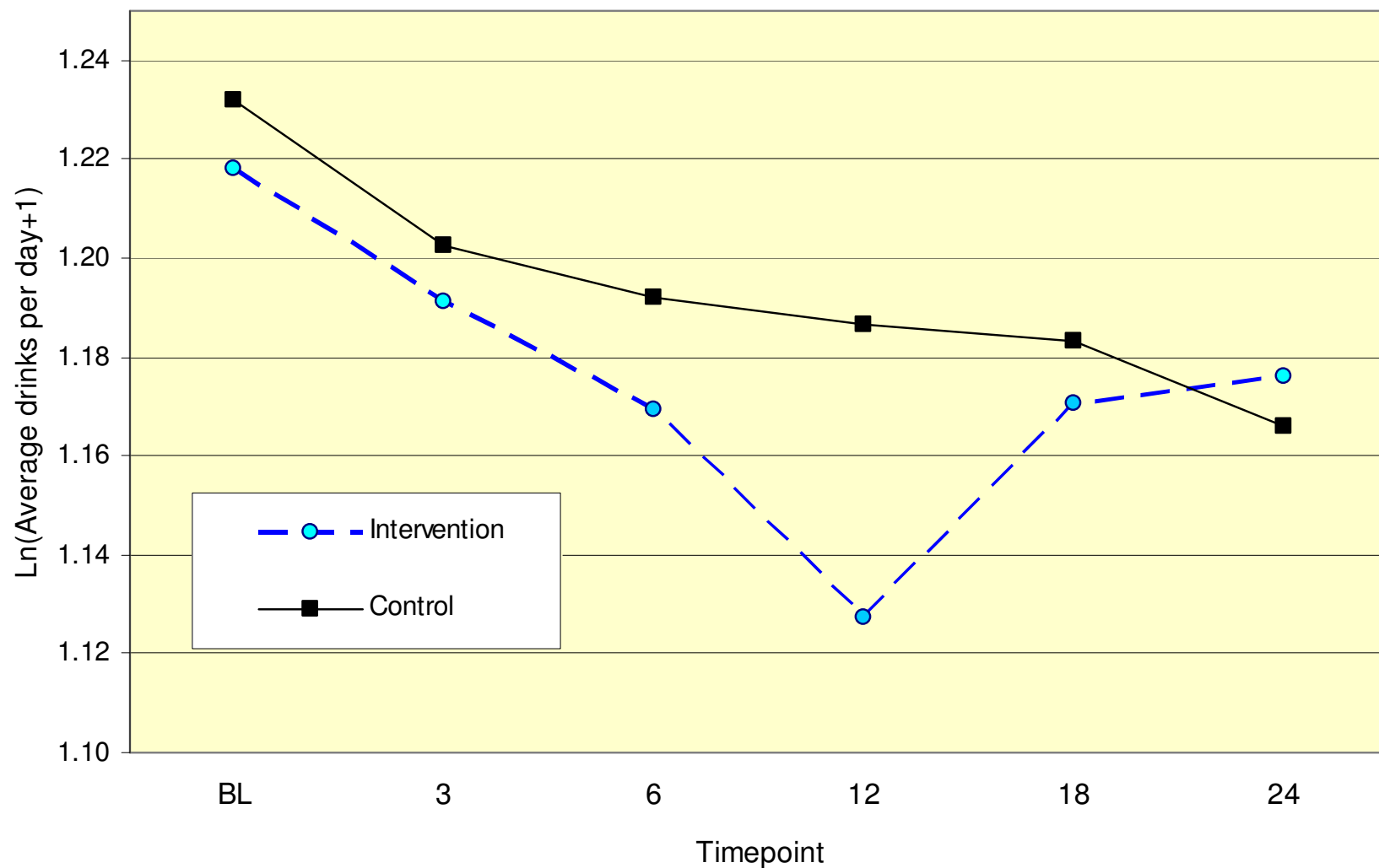
Number of Drinking Days per week by Intervention Group Random Coefficient Model Estimates



TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2837)} = 1.65, p = 0.1464$

 $p < .05$ at Timepoint

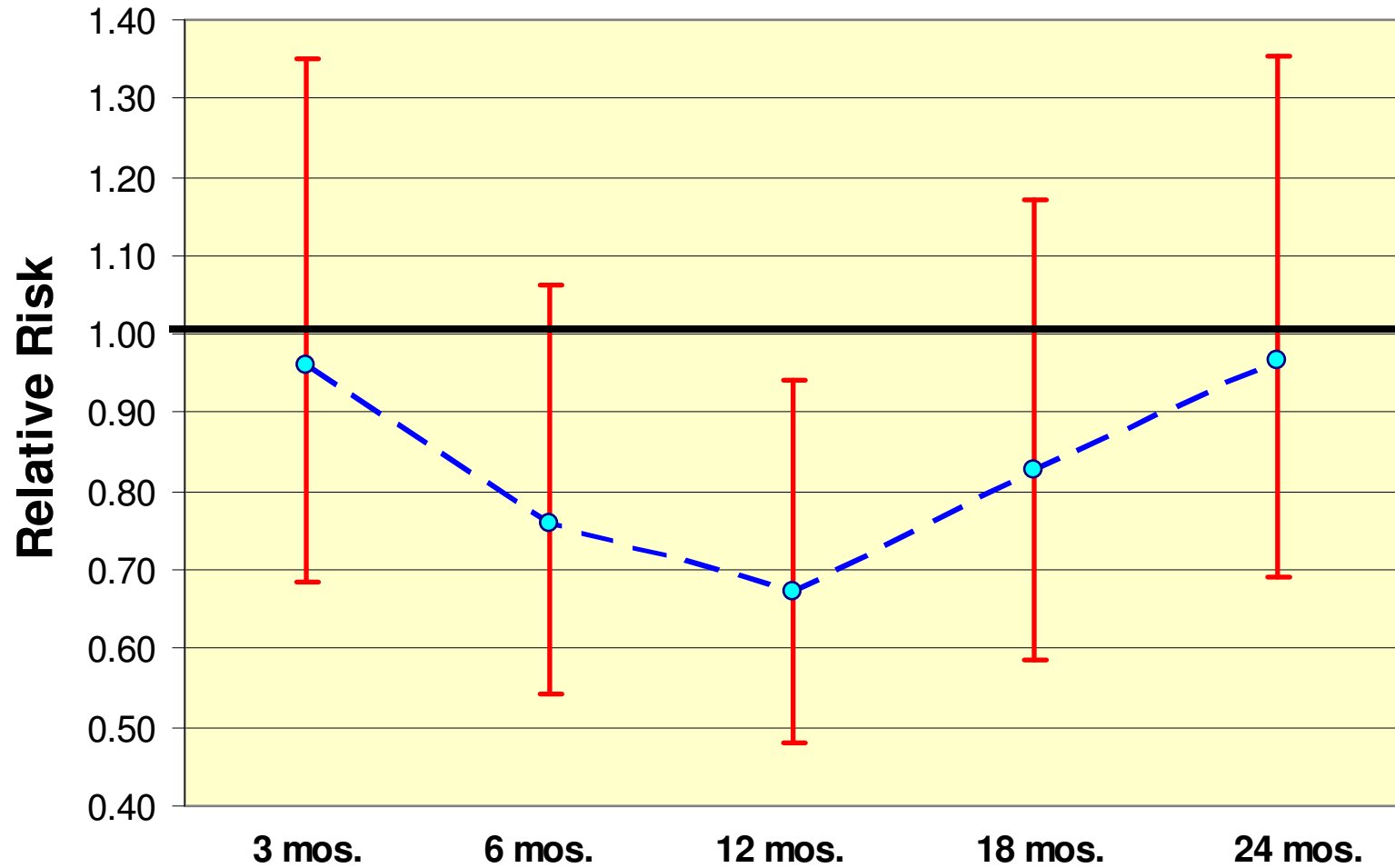
Drinks per Drinking Day (Average Quantiy) (ln) by Intervention Group Random Coefficient Model Estimates



p-Value at Timepoint

Figure 3:

Intervention Effects on Alcohol "At-Risk Status" (Intervention Risk/Control Risk)



Treatment Effects on Alcohol Risks and Behaviors by Timepoint

	Estimate	Standard Error	DF	t-value	Pr > t
Alcohol Use Behavior Index , (ln)					
Time*Group 03	-0.0155	0.0355	2843	-0.44	0.6631
Time*Group 06	-0.0508	0.0362	2843	-1.4	0.1602
Time*Group 12	-0.1059	0.0375	2843	-2.82	0.0048
Time*Group 18	-0.028	0.0396	2843	-0.71	0.4785
Time*Group 24	-0.0104	0.0423	2843	-0.24	0.8067
Number of Alcohol Risks					
Time*Group 03	-0.1101	0.0831	2843	-1.33	0.1849
Time*Group 06	-0.1913	0.0842	2843	-2.27	0.0232
Time*Group 12	-0.305	0.086	2843	-3.54	0.0004
Time*Group 18	-0.1805	0.0887	2843	-2.04	0.041
Time*Group 24	-0.1145	0.0923	2843	-1.24	0.215
Drinks per Week ln(1+Quantity X Frequency)					
Time*Group 03	-0.0499	0.0442	2834	-1.13	0.2591
Time*Group 06	-0.1069	0.0451	2834	-2.37	0.0178
Time*Group 12	-0.1122	0.047	2834	-2.39	0.017
Time*Group 18	-0.1014	0.0498	2834	-2.03	0.042
Time*Group 24	-0.0359	0.0537	2834	-0.67	0.5042
Number of "Binge" Episodes per month ln(1+ # binge)					
Time*Group 03	-0.0374	0.0458	2804	-0.82	0.4141
Time*Group 06	-0.0856	0.0465	2804	-1.84	0.0656
Time*Group 12	-0.1175	0.0477	2804	-2.46	0.0139
Time*Group 18	-0.0645	0.0494	2804	-1.31	0.1914
Time*Group 24	-0.0891	0.0513	2804	-1.74	0.0824
30 day "Peak", Maximum Number of Drinks on any one occasion, ln(1+peak)					
Time*Group 03	-0.02510	0.03263	2836	-0.77	0.4419
Time*Group 06	-0.05156	0.03314	2836	-1.56	0.1199
Time*Group 12	-0.08825	0.03406	2836	-2.59	0.0096
Time*Group 18	-0.04000	0.03543	2836	-1.13	0.2590
Time*Group 24	-0.01966	0.03737	2836	-0.53	0.5989
Number Drinking DAYS per week (Frequency)					
Time*Group 03 -	-0.1494	0.0853	2837	-1.75	0.0798
Time*Group 06	-0.2428	0.0872	2837	-2.78	0.0054
Time*Group 12	-0.1374	0.0921	2837	-1.49	0.1360
Time*Group 18	-0.1734	0.0996	2837	-1.74	0.0817
Time*Group 24	-0.1435	0.1094	2837	-1.31	0.1897
Drinks per Drinking Day (Quantity)					
Time*Group 03	-0.0025	0.026	2838	0.10	0.9241
Time*Group 06	-0.0088	0.0265	2838	-0.33	0.7403
Time*Group 12	-0.0456	0.0275	2838	-1.66	0.0970
Time*Group 18	0.001	0.0289	2838	0.04	0.9711
Time*Group 24	0.0236	0.0309	2838	0.76	0.4458

Treatment Effects on Alcohol Risks and Behaviors

Alcohol Use Behavior Index, (ln)

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03	-0.0155	0.0355	2843	-0.44	0.6631
Time*Group 06	-0.0508	0.0362	2843	-1.4	0.1602
Time*Group 12	-0.1059	0.0375	2843	-2.82	0.0048
Time*Group 18	-0.0280	0.0396	2843	-0.71	0.4785
Time*Group 24	-0.0104	0.0423	2843	-0.24	0.8067

TYPE 3 test of Time*Group fixed effect: $F_{(df=5, 2843)} = 2.23, p = 0.0484$

Number of Alcohol Risks

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03	-0.1101	0.0831	2843	-1.33	0.1849
Time*Group 06	-0.1913	0.0842	2843	-2.27	0.0232
Time*Group 12	-0.3050	0.086	2843	-3.54	0.0004
Time*Group 18	-0.1805	0.0887	2843	-2.04	0.0418
Time*Group 24	-0.1145	0.0923	2843	-1.24	0.2150

TYPE 3 test of Time*Group fixed effect: $F_{(df=5, 2843)} = 2.84, p = 0.0147$

Drinks per Week ln(1+Quantity X Frequency)

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03	-0.0499	0.0442	2834	-1.13	0.2591
Time*Group 06	-0.1069	0.0451	2834	-2.37	0.0178
Time*Group 12	-0.1122	0.047	2834	-2.39	0.017
Time*Group 18	-0.1014	0.0498	2834	-2.03	0.042
Time*Group 24	-0.0359	0.0537	2834	-0.67	0.5042

TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2834)} = 2.04, p = 0.0702$

Number of “Binge” Episodes per month $\ln(1 + \# \text{ binge})$

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03	-0.0374	0.0458	2804	-0.82	0.4141
Time*Group 06	-0.0856	0.0465	2804	-1.84	0.0656
Time*Group 12	-0.1175	0.0477	2804	-2.46	0.0139
Time*Group 18	-0.0645	0.0494	2804	-1.31	0.1914
Time*Group 24	-0.0891	0.0513	2804	-1.74	0.0824

TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2804)} = 1.47, p = 0.1964$

30 day “Peak”, Maximum Number of Drinks on any one occasion, $\ln(1 + \text{peak})$

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03	-0.02510	0.03263	2836	-0.77	0.4419
Time*Group 06	-0.05156	0.03314	2836	-1.56	0.1199
Time*Group 12	-0.08825	0.03406	2836	-2.59	0.0096
Time*Group 18	-0.04000	0.03543	2836	-1.13	0.2590
Time*Group 24	-0.01966	0.03737	2836	-0.53	0.5989

TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2836)} = 1.65, p = 0.1439$

Number Drinking DAYS per week (Frequency)

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03 -	-0.1494	0.0853	2837	-1.75	0.0798
Time*Group 06	-0.2428	0.0872	2837	-2.78	0.0054
Time*Group 12	-0.1374	0.0921	2837	-1.49	0.1360
Time*Group 18	-0.1734	0.0996	2837	-1.74	0.0817
Time*Group 24	-0.1435	0.1094	2837	-1.31	0.1897

TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2837)} = 1.65, p = 0.1464$

Drinks per Drinking Day (Quantity)

	Estimate	Standard Error	DF	t-value	Pr > t
Time*Group 03	-0.0025	0.026	2838	0.10	0.9241
Time*Group 06	-0.0088	0.0265	2838	-0.33	0.7403
Time*Group 12	-0.0456	0.0275	2838	-1.66	0.0970
Time*Group 18	0.001	0.0289	2838	0.04	0.9711
Time*Group 24	0.0236	0.0309	2838	0.76	0.4458

TYPE 3 test of fixed effect: Time*Group: $F_{(df=5, 2838)} = 136, p = 0.2346$

Conclusion

- This randomized controlled trial has demonstrated that a series of three brief motivationally tailored computer feedback reports delivered by mail can significantly decrease immoderate or “at-risk” drinking behavior up to 12 months after the end of the intervention.
- Moreover, it has shown that low cost brief interventions for at-risk drinkers identified by simple screening can be an important public health mechanism for alcohol harm reduction for a large segment of the population who are not ordinarily identified for alcohol treatment.
- Research continues on personal and situational factors that can influence the population impact and maintenance of these intervention effects.