Table 1. *Means (M) and standard deviations (SD) of descriptive and injunctive norms across time*

Norm type	Baseline		1 month follow up		2 month follow up	
	Perceived norm M (SD)	Actual norm M (SD)	Perceived norm M (SD)	Actual norm M (SD)	Perceived norm M (SD)	Actual norm M (SD)
Descriptive norms						
1. Frequency of consumption	5.00 (1.16)	3.99 (1.67)[a]	4.32 (1.24)[b]	3.54 (1.57)[b]	4.25 (1.52)[b]	3.54 (1.71)[b]
2. Average drinks per Occasion	5.98 (1.55)	5.26 (2.27)[a]	4.88 (1.69)[b]	4.27 (2.00)[b]	4.75 (1.86)[b]	4.12 (2.02)[b]
3. Drinks/week	6.13 (1.93)	4.63 (2.58)[a]	4.63 (1.90)[b]	3.73 (2.04)[b]	4.50 (2.05)[b]	3.67 (2.17)[b]
4. Peak drinks in past 30 days	5.60 (1.60)	4.65 (2.14)[a]	4.46 (1.77)[b]	3.56 (1.94)[b]	4.24 (1.79)[b]	3.48 (1.90)[b]
5. Heavy episodic events before 2 weeks	4.35 (1.73)	3.07 (2.08)[a]	3.38 (1.51)[b]	2.61 (1.66)[b]	3.38 (1.67)[b]	2.63 (1.79)[b]
Descriptive norm composite variable	5.41 (1.23)	4.32 (1.90)[a]	4.33 (1.36)[b]	3.54 (1.61)[b]	4.23 (1.57)[b]	3.49 (1.72)[b]
Injunctive norms						
1. Intoxicated at a party	5.60 (1.35)	5.10 (1.71)[a]	4.80 (1.55)[b]	4.43 (1.68)[b]	4.60 (1.73)[b]	4.19 (1.89)[b]
2. Miss class because of hangover	3.16 (1.69)	2.07 (1.45)[a]	2.76 (1.51)[b]	1.97 (1.32)	2.80 (1.64)[b]	2.04 (1.50)
3. Drunk in-season	4.62 (1.68)	3.97 (1.99)[a]	3.78 (1.61)[b]	3.34 (1.76)[b]	3.67 (1.71)[b]	3.31 (1.78)[b]
4. Drink within 3 days of game	3.31 (1.87)	2.61 (1.96)[a]	2.84 (1.57)[b]	2.35 (1.61)	2.92 (1.70)[b]	2.40 (1.70)
5. Initiation with alcohol	4.75 (1.99)	3.81 (2.27)[a]	3.75 (1.94)[b]	3.17 (1.97)[b]	3.64 (1.95)[b]	3.08 (1.97)[b]
Injunctive norm composite variable	4.28 (1.17)	3.51 (1.43)[a]	3.59 (1.25)[b]	3.06 (1.25)[b]	3.53 (1.41)[b]	3.01 (1.36)[b]

N = 524, 543, and 528 for baseline, 1 month and 2 month follow up, respectively. [a]$P < 0.001$: differences in perceived norms vs. actual drinking behaviour or attitudes at baseline. [b]$P < 0.001$: differences across time from baseline for same variable type. Response options for each descriptive norm item are found in Appendix I. Response options for each injunctive norm item range from 1 (not acceptable) to 7 (always acceptable).

suggested that changes in attitudes, descriptive norms and injunctive norms were all strongly associated with changes in drinking.

Discussion

The current findings extend previous research by using innovative, technologically-advanced techniques in the application of group-specific normative feedback with student athletes. Discrepancies were challenged in a live feedback setting, which authenticated the presence of misperceptions that were held by the group and allowed for homogenous exposure across participants. This created an environment through which the theoretical foundation of the research design could be realised. Although the lack of a control condition precludes inferences about causation, the presentation of accurate and salient behavioural and attitudinal norms was associated with reported reductions in norms, attitudes, behaviour and consequences. Thus, the value of this study lies in the innovative technology used and support for the proof of concept in the application of this technology to an at-risk group: student athletes.

The current study is the first to apply this approach to student athletes and intervene with perceptions of both descriptive and injunctive norms. While initial equipment costs, facilitator training and time spent organising intervention meetings exist with the current approach, once these early preparations are in place, group interventions can be conducted on a frequent basis and in a short amount of time. Moreover, effect sizes observed in this study and a previous controlled trial evaluating this approach [8] are similar to those reported for individually delivered interventions for college students that include a social norms component ([17], see [29] for meta-analysis, [30]).

Researchers are encouraged to continue to test the efficacy of BLING with other groups of high-risk drinkers. In addition, college personnel might wish to use BLING, especially with tight-knit or high-risk drinking groups, such as incoming freshmen students, to disrupt the development and sway of alcohol misperceptions. For example, this BLING intervention could be implemented as a regular part of freshmen orientation or within residence halls, to examine and challenge stereotypes of the 'typical incoming freshman' or provide
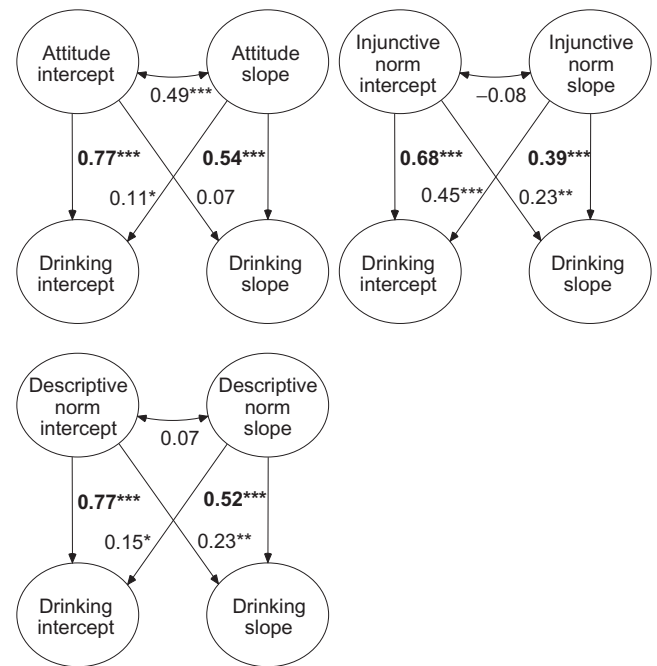
Table 2. *Repeated measures ANOVA (n = 493)*

Dependent variable and effect	d.f.	F	P	r
Drinking composite				
Time	(2, 774)	110.79	<0.001	0.35
Time × sex	(2, 774)	10.12	<0.001	0.11
Time × school	(2, 774)	0.51	0.60	0.03
Time × season	(2, 774)	1.33	0.26	0.04
Alcohol-related consequences				
Time	(2, 736)	12.56	<0.001	0.13
Time × sex	(2, 736)	0.35	0.71	0.02
Time × school	(2, 736)	2.05	0.13	0.05
Time × season	(2, 736)	2.06	0.13	0.05
Attitudes				
Time	(2, 772)	49.80	<0.001	0.25
Time × sex	(2, 772)	2.30	0.10	0.05
Time × school	(2, 772)	3.26	0.04	0.06
Time × season	(2, 772)	0.47	0.63	0.02
Injunctive norms				
Time	(2, 772)	76.08	<0.001	0.30
Time × sex	(2, 772)	0.08	0.92	0.01
Time × school	(2, 772)	3.36	0.04	0.07
Time × season	(2, 772)	1.17	0.31	0.04
Descriptive norms				
Time	(2, 774)	168.96	<0.001	0.42
Time × sex	(2, 774)	6.68	0.001	0.09
Time × school	(2, 774)	1.20	0.30	0.04
Time × season	(2, 774)	0.26	0.77	0.02

ANOVA, analysis of variance; d.f., degrees of freedom.

Table 3. *Marginal means and standard errors (SE) (n = 493)*

Variable	Mean	SE
Drinking: baseline	4.34	0.09
Drinking: 1 month follow up	3.49	0.08
Drinking: 2 month follow up	3.49	0.09
Alcohol problems: baseline	4.66	0.27
Alcohol problems: 1 month follow up	4.00	0.26
Alcohol problems: 2 month follow up	3.45	0.26
Attitude: baseline	3.45	0.07
Attitude: 1 month follow up	2.98	0.07
Attitude: 2 month follow up	2.98	0.07
Injunctive norm: baseline	4.29	0.06
Injunctive norm: 1 month follow up	3.59	0.07
Injunctive norm: 2 month follow up	3.54	0.07
Descriptive norm: baseline	4.29	0.06
Descriptive norm: 1 month follow up	3.59	0.07
Descriptive norm: 2 month follow up	3.54	0.07

Figure 2. *Standardised path coefficients for the three latent growth models (n = 660).*

such groups, such as varying levels of exposure across targeted groups and individuals, disbelief of normative information, lengthy implementation periods and unfavourable reactions to the normative messages [6,21,27,31].

Study strengths must be viewed in light of several limitations. First, as noted earlier, the current study did not use an experimental design with a randomised matched control group. Therefore, post-intervention reductions in primary alcohol-related outcomes of the study cannot be reliably attributed specifically to the intervention. One possible explanation consistent with the pattern of results is regression to the mean. Although the use of two distinct athletic populations on opposite coastal regions helps validate the methodological applicability and feasibility of the research protocol, future research should trial the intervention procedures with the use of a control group and evaluate the longer-term effects among participants. In addition, the majority of outcomes were technically count data, which have been shown to yield biased results in ANOVA and related approaches [32,33]. This limitation is somewhat offset by the use of composite variables (five items), resulting in at least 35 possible response options. A theoretical limitation is the possibility that providing norms to light drinkers and abstainers might have iatrogenic effects. However, a recent universal prevention using personalised feedback, which included campus norms, showed a protective effect of the intervention rather than an iatrogenic one on abstaining

actual healthy norms of and to groups of residents living on the same floor. Although speculative, the influence of this group-specific feedback might lie in minimising some of the drawbacks associated with failed marketing campaigns that have traditionally targeted