AN ANALYSIS OF DIFFERENCES IN OUTCOMES FROM INDUSTRY FUNDED AND NON-INDUSTRY FUNDED STUDIES OF ALCOHOL MIXED WITH ENERGY DRINK (AMED)

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BACKGROUND

- Over the past few years there has been increasing research interest into the functional consequences of consuming alcohol mixed with energy drink (AMED).
- At the same time, the proportion of research funded by industry has increased across all sectors. This has led to concerns that industry-funded AMED studies may be biasing reports of AMED effects, including two recent papers from Australia[1,2].
- Unusually neither paper employed any statistical analyses to tests their contention.
- Here we compared outcomes from AMED studies, here focusing on industry and non-industry funded studies

METHODS

- Utilising the categorisation of McKetin et al[2], 62 studies (9 industry-funded) were grouped as examining the relationship between AMED and:
  - *alcohol consumption*
  - *alcohol-related harms*
  - *increased intoxication*
  - *alcohol impairment*

  (each included different methodologies).
- We applied chi-squared analysis to examine if outcomes from industry-funded research differed significantly from those from non industry-funded research.
- Secondly we specifically examined level of alcohol consumption and performed a meta-analysis of within-subjects studies (comparing AMED with alcohol alone) both including and excluding industry and non industry-funded studies.

RESULTS: CHI-SQUARED ANALYSIS

- Chi-squared analyses were performed on the data presented in Tables 1-6 from McKetin et al[2] (table 1).
- Categorised outcomes were analysed for differences between industry and non-industry funded studies.
- Omitting NR data did not change any significance ($.123 \leq p \geq .972$) nor did re-analysis using Fisher's exact test where expectancy cells had N < 5 ($.065 \leq p \geq 1.00$).
- From these data, the outcome of studies into consequences of AMED consumption is independent of the source of funding.

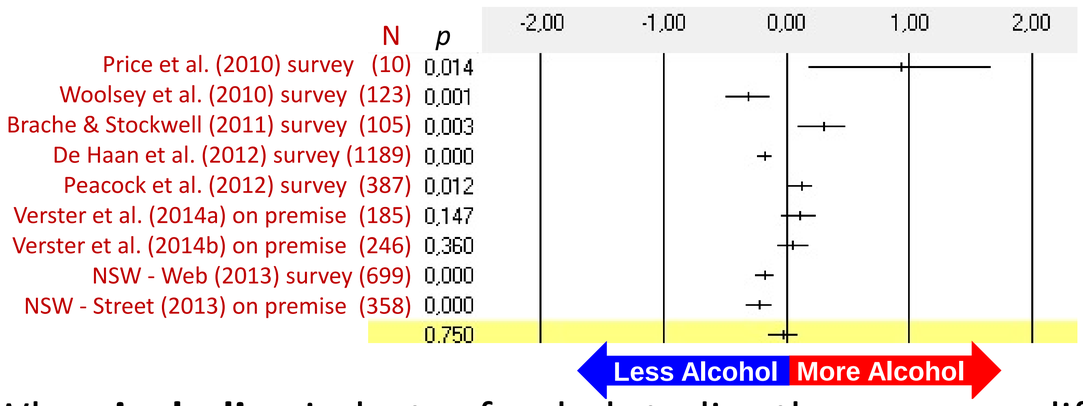
Nature of studies	N studies [industry involvement]			N outcomes	Chi-square	*p*
	[No]	[Yes]	[NR]			
Studies examining the relationship between ED/caffeine and alcohol consumption	16	4	4	24	6.189	.288
Studies examining the relationship between ED/caffeine and alcohol-related harms	8	2	2	26	1.472	.916
Experimental studies examining the relationship between ED or caffeine and alcohol-related harms	2	2	0	9	5.760	.124
Non-experimental studies examining whether ED alters alcohol intoxication	6	1	3	23	2.962	.706
Experimental studies examining whether ED/caffeine alters alcohol intoxication	16	4	2	90	1.062	.957
Experiments examining whether ED/caffeine reduces alcohol-related impairment	18	2	5	50	5.499	.358

Table 1. Statistical comparison of outcomes from studies with and without industry involvement (all categories from and data extracted from McKetin et al[2]), NR = not reported.

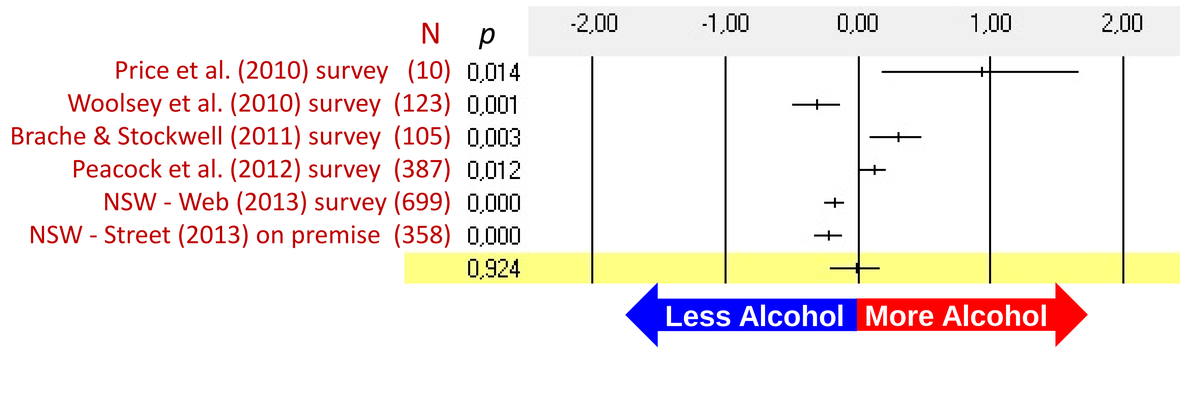
RESULTS: META-ANALYSIS

Separate meta-analyses were performed on within-subjects studies comparing alcohol consumption following AmED an alcohol alone both **including** and **excluding** industry funded studies.

Including industry-funded studies
(Std difference in means and 95% CI)



Excluding industry-funded studies
(Std difference in means and 95% CI)



- When **including** industry-funded studies there was no difference in the amount of alcohol consumed on AMED compared with non-AMED occasions (p = .750).
- When **excluding** industry-funded studies there was no difference in the amount of alcohol consumed on AMED compared with non-AMED occasions (p = 0.924).
- The outcome of studies into alcohol consumption following AMED is independent of the source of funding.

SUMMARY AND CONCLUSION

- Commentaries suggesting that industry funding may bias the reporting of outcomes of AMED studies[1,2] may be based on relatively superficial appraisal of the literature.
- Using more widely-accepted analytical methods there appears to be no evidence to support this contention. Nevertheless research in this field needs to be carefully scrutinized whatever the source of funding.

REFERENCES

1. Miller P (2013) Energy drinks and alcohol: research supported by industry may be downplaying harms. *BMJ* **347**, f5345.
2. McKetin R, Coen A, Kaye S (2015) A comprehensive review of the effects of mixing caffeinated energy drinks with alcohol. *Drug and Alcohol Dependence* **151**, 15–30.

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