

Statistics 1B Interludes

13. 'Not statistically significant'

Most studies crave 'significance'

XKCD, Jan 2015

| p-VALUE | INTERPRETATION |
|---------|--|
| 0.001 | HIGHLY SIGNIFICANT |
| 0.01 | |
| 0.02 | |
| 0.03 | |
| 0.04 | SIGNIFICANT |
| 0.049 | |
| 0.050 | OH CRAP. REDO CALCULATIONS. |
| 0.051 | ON THE EDGE OF SIGNIFICANCE |
| 0.06 | |
| 0.07 | HIGHLY SUGGESTIVE, SIGNIFICANT AT THE P<0.10 LEVEL |
| 0.08 | |
| 0.09 | |
| 0.099 | HEY, LOOK AT THIS INTERESTING SUBGROUP ANALYSIS |
| ≥0.1 | |

Still Not Significant

Posted on April 21, 2013 | 126 Comments

...and this is where we put the non-significant results.



Collects real phrases from academic papers

a borderline significant trend (p=0.09)
 a certain trend toward significance (p=0.08)
 a clear tendency to significance (p=0.052)
 a clear trend (p<0.09)
 a clear, strong trend (p=0.09)
 a considerable trend toward significance (p=0.069)
 a decreasing trend (p=0.09)
 a definite trend (p=0.08)
 a distinct trend toward significance (p=0.07)
 a favorable trend (p=0.09)

somewhat statistically significant (p=0.092)
 strong trend toward significance (p=0.08)
 sufficiently close to significance (p=0.07)
 suggestive but not quite significant (p=0.061)
 suggestive of a significant trend (p=0.08)
 suggestive of statistical significance (p=0.06)
 suggestively significant (p=0.064)
 tailed to insignificance (p=0.1)
 tantalisingly close to significance (p=0.104)
 technically not significant (p=0.06)
 teetering on the brink of significance (p=0.06)
 tend to significant (p>0.1)

Today's story!

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MURINE
bright & moist eyes

Poor behaviour is linked to head lice treatments: Chemicals used to tackle the problem may effect nerve activity in the brain

- Head lice treatments could lead to behavioural problems in some young children
- That was the suggestion published in report by the University of Rennes, France
- Issue surrounds pyrethroids - synthetic chemicals used in common pesticides
- Exposure could lead to children developing social problems by the age of six

By BEN SPENCER, MEDICAL CORRESPONDENT FOR THE DAILY MAIL
 PUBLISHED: 01:49, 2 March 2017 | UPDATED: 01:49, 2 March 2017

OEM Online First, published on March 1, 2017 as 10.1136/oemed-2016-104035

Environment

ORIGINAL ARTICLE

Behavioural disorders in 6-year-old children and pyrethroid insecticide exposure: the PELAGIE mother-child cohort

Jean-François Viel,^{1,2} Florence Rouget,^{1,3} Charline Warembourg,¹ Christine Monfort,¹ Gwendolina Limon,⁴ Sylvaine Cordier,¹ Cécile Chevrier¹

- Measured insecticide metabolites in urine of 571 pregnant women
- 6 years later measured metabolites in 287 children
- Correlated with behavioural problems
- 5 metabolites at 3 levels, mothers/children, 3 outcome scales
- **= 60 95% confidence intervals for associations** (adjusted with logistic regression)
- Only one excluded 1.

30 more sensitive tests? Children shown below

Table 4 Adjusted ORs* (95% CI) and Cox p values for abnormal or borderline scores on the SDQ and child concentrations of urinary pyrethroid metabolites (n=282, PELAGIE cohort, France)

| Metabolites (µg/L) | Internalising score OR (95% CI) | Externalising score OR (95% CI) | Reverse-scored prosocial behaviour OR (95% CI) |
|--------------------|------------------------------------|------------------------------------|---|
| 3-PBA | | | |
| <0.008† | Ref. | Ref. | Ref. |
| 0.008–0.037 | 1.41 (0.73 to 2.73) | 1.52 (0.67 to 3.42) | 2.83 (1.27 to 6.78) |
| ≥0.038 | 0.70 (0.34 to 1.46) | 1.96 (0.90 to 4.30) | 1.91 (0.80 to 4.57) |
| Cox p value† | 0.94 | 0.04 | 0.07 |
| 4-F-3-PBA | | | |
| <0.003† | Ref. | Ref. | Ref. |
| ≥0.003 | 0.86 (0.07 to 1.28)§ | 0.55 (0.21 to 1.41)¶ | 1.35 (0.59 to 3.07) |
| Cox p value† | 0.71 | 0.27 | 0.34 |
| 4-F-DCCA | | | |
| <0.067† | Ref. | Ref. | Ref. |
| 0.067–0.158 | 1.06 (0.52 to 2.15) | 0.63 (0.27 to 1.45)§ | 1.20 (0.53 to 2.71)** |
| ≥0.159 | 0.97 (0.47 to 2.03) | 0.97 (0.44 to 2.15)§ | 1.05 (0.45 to 2.56)** |
| Cox p value† | 0.95 | 0.80 | 0.68 |
| trans-DCCA | | | |
| <0.136 | Ref. | Ref. | Ref. |
| 0.136–0.409 | 1.22 (0.59 to 2.51)§ | 0.60 (0.27 to 1.33) | 0.71 (0.30 to 1.64)†† |
| ≥0.410 | 0.99 (0.47 to 2.10)§ | 0.57 (0.25 to 1.30) | 0.76 (0.32 to 1.82)†† |
| Cox p value† | 0.91 | 0.03 | 0.06 |
| 2,6-DBCA | | | |
| <0.134 | Ref. | Ref. | Ref. |
| 0.134–0.345 | 0.49 (0.22 to 1.13)†† | 1.92 (0.29 to 1.57)†† | 0.91 (0.35 to 2.34)†† |
| ≥0.346 | 1.49 (0.73 to 3.06)†† | 0.82 (0.36 to 1.86)†† | 2.14 (0.89 to 5.18)†† |
| Cox p value† | 0.49 | 0.55 | 0.23 |

- Paper and press release only reported the few significant results [2 positive and 1 negative]
- A green jelly-bean example?
- And maybe children with behavioural problems get more head lice? [reverse causation]

But sometimes 'non-significance' is of interest ...

All cause mortality and the case for age specific alcohol consumption guidelines: pooled analyses of up to 10 population based cohorts

OPEN ACCESS

Craig S Knott *research associate*¹, Ngaire Coombs *research associate*^{2,3}, Emmanuel Stamatakis *associate professor*^{2,4,5}, Jane P Biddulph *lecturer*¹

February 2015

confounders. Compared with never drinkers, age stratified analyses suggest that beneficial dose-response relations between alcohol consumption and all cause mortality may be largely specific to women drinkers aged 65 years or more, with little to no protection present in other age-sex groups. These protective associations may, however, be

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George would have loved this! Pregnant

The EIGHTEEN missed chances to

Maths teacher is sacked after student

Talented young opera singer who

Drinking is only good for you if you are a woman over 65: Sobering study finds medicinal qualities of a daily tipples have been overstated - except in older females

- Previous studies suggested small amounts of booze may protect the heart
- But latest study warns findings may have been skewed by selection
- Non-drinkers may include people forced to stop for medical reasons

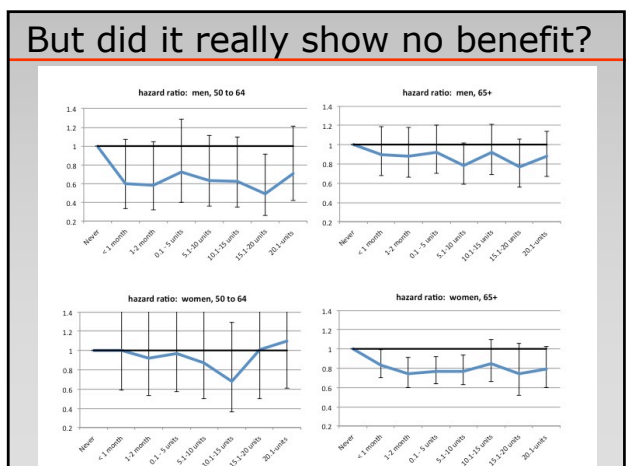
THE TIMES Science

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Welcome to your preview of The Times

Alcohol has no health benefits after all

Behind the story
'No booze' is a
Conflicting headline
two problems. The
The last update



Conclusions

- Point estimates for all consumption levels show protection
- Confidence intervals are wide as few deaths in the baseline (never-drinker) category
- Wide CIs include plausible protective effects
- But authors essentially interpret 'not significantly different' as 'no effect'
- A serious misuse of statistics