

# A Process Analysis of Addictive Behaviors in Adults with Co-Occurring Disorders

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Chair: John O'Neill  
Discussant: Timothy M. Weil

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# Background

Addictive behaviors are highly prevalent among individuals with severe psychopathology

- ~50% percent of these individuals have an alcohol use disorder
- ~30% an illicit drug use disorder
- up to 90% a nicotine use disorder

Co-occurring psychopathology and addictive behaviors have ***dramatic costs for individuals and society***

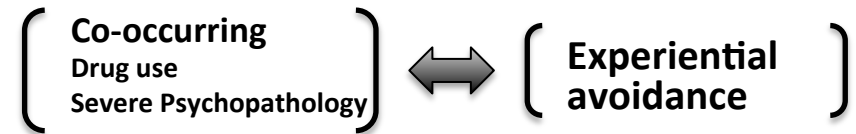
**316 annual billion** in healthcare and disability costs

However, from a CBS perspective, there is ***little research examining the psychological processes*** underlying addictive behavior in this population

# Study goals

## Primary goal

A process analysis of experiential avoidance in order to inform treatment development efforts among individuals with co-occurring disorders



## Secondary goal

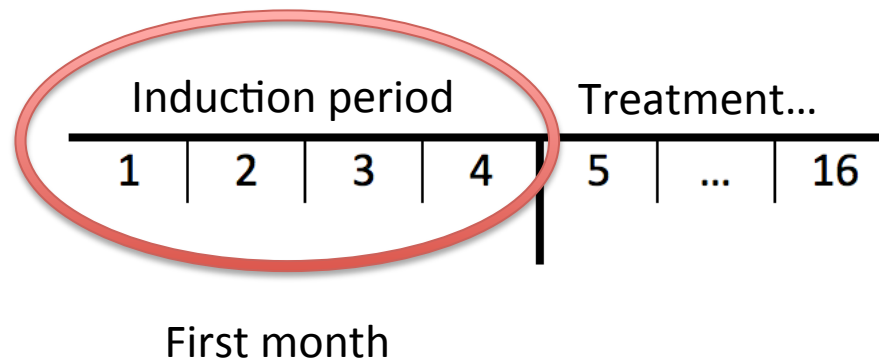
A process analysis of different, but related, processes of change

# Design

- **Secondary analysis** of ongoing RCT of contingency management (vs non-contingency control) of monetary incentives on alcohol abstinence
- Sample of individuals with
  - (a) *schizophrenia, schizoaffective, bipolar and depressive disorders with psychotic features*) and
  - (b) at least an *alcohol disorder*
- Analysis of the **induction period** prior to randomization (4 weeks)

## Processes

- **Global experiential avoidance**
- **Weekly experiential acceptance** of alcohol cravings
- **Weekly cognitive reappraisal** of alcohol cravings
- Alcohol specific **stages of change**: ambivalence, awareness of an alcohol problem, steps taken towards recovery



# Measures

## Outcomes

- 1. Psychiatric symptoms:**
  - Brief Symptom Inventory (BSI)
- 2. Biological measures of drug use:**
  - Thermo Scientific MGC 240 Bench Top Analyzer (biological measure)
    - Alcohol
    - Illicit drugs: Opiates, Meth, Amp, Cocaine, MJ
  - Carbon monoxide analysis (Bedfont Smokalyzer)

## Processes

- 1. Global experiential avoidance:**
  - Acceptance and Action Questionnaire – II
- 2. Weekly experiential acceptance of alcohol cravings:**
  - "In the past 7 days, how disturbed or stressed have you felt by your alcohol cravings?"
  - "During those cravings, how much have you simply noticed your feelings and continued what you were doing?"

## Secondary Processes

- 1. Weekly cognitive reappraisal of alcohol cravings:**
  - "During those cravings, how much have you made yourself think about it in a way to help you stay calm?"
- 2. Global self-report measure of stages of change:**
  - Substance Abuse Treatment Scale (SOCRATES):
    - Recognition
    - Ambivalence
    - Taking steps

# Participants

## Demographics

- 79 participants
- 70% males
- 54% white, 30% black
- 6% Hispanic
- Mean age = 46 years

## Psychiatric symptoms

- Schizophrenia: 13%
- Bipolar disorder: 33%
- Schizoaffective disorder: 18%
- Recurrent major depressive disorder: 35%

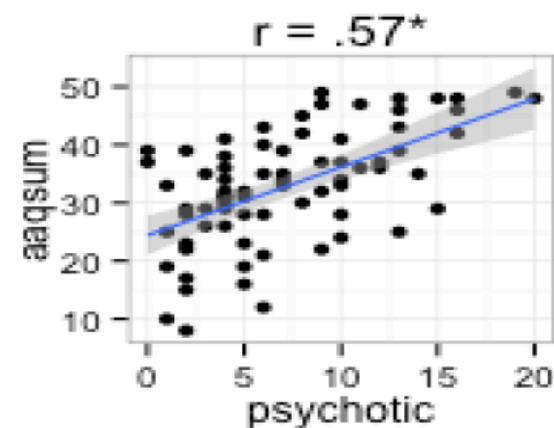
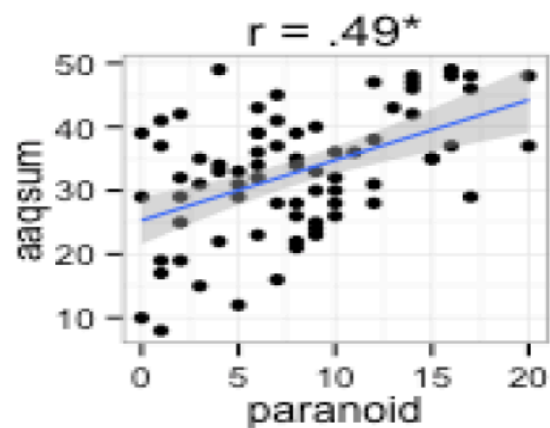
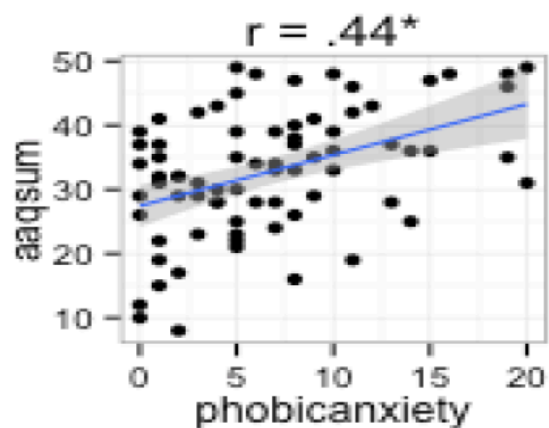
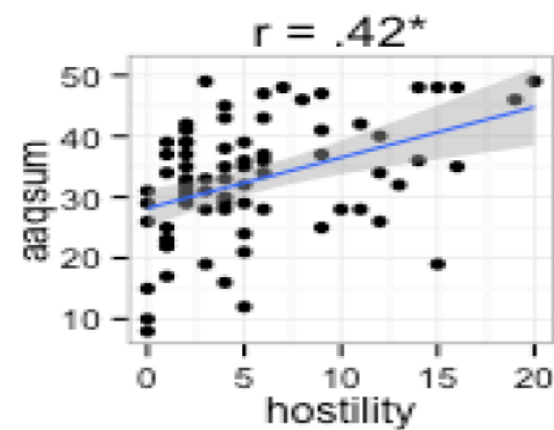
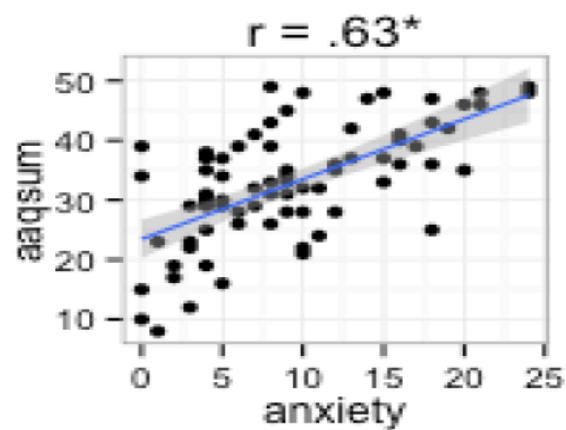
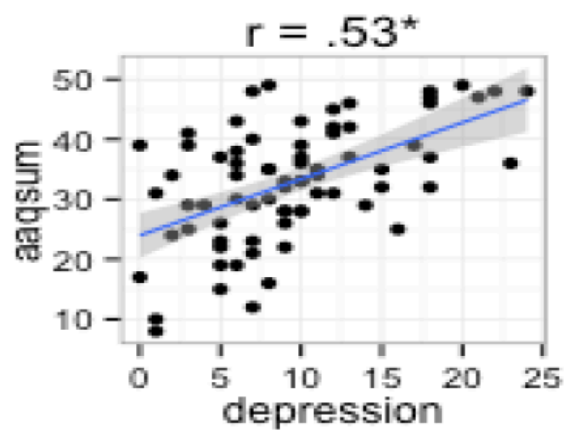
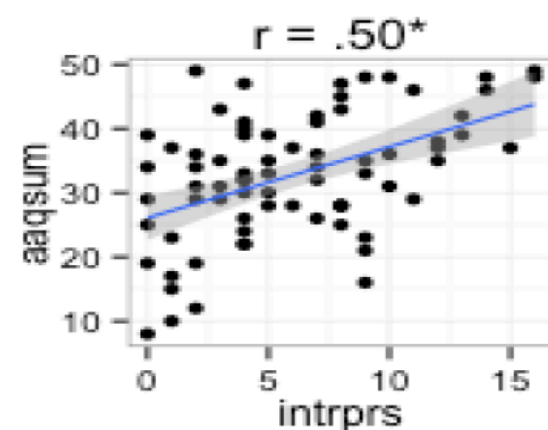
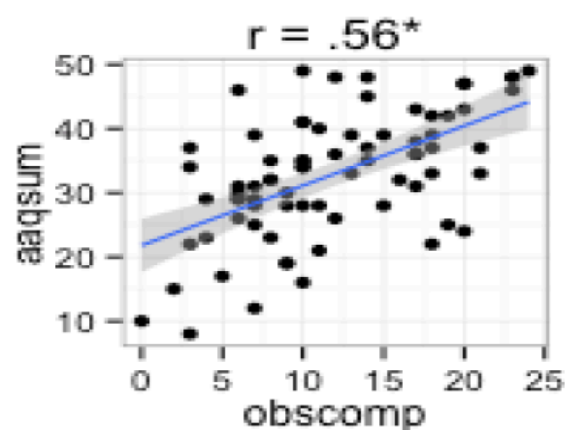
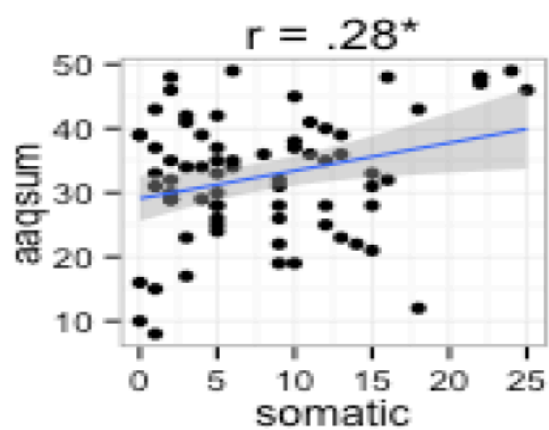
## Drug use

76% were smokers at baseline

73% had at least 10 drinks in the last month

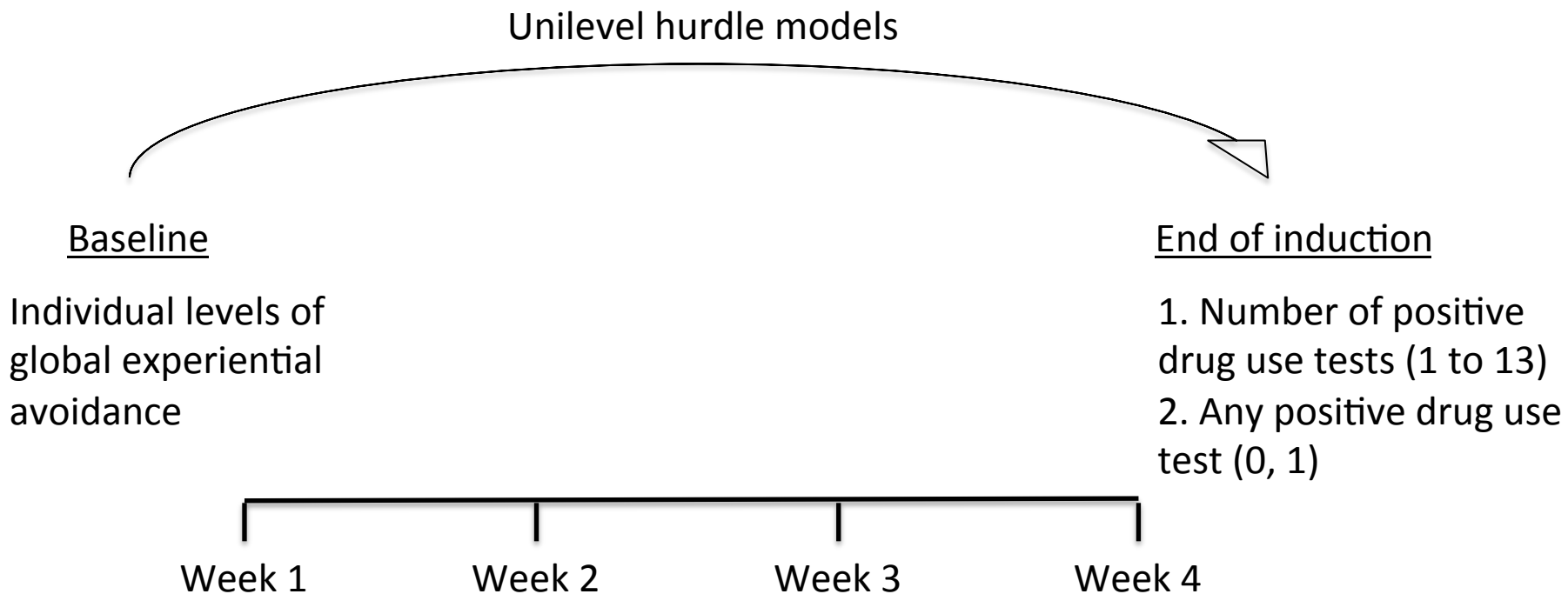
73% had drugs in the last month

Is there an association between  
*global experiential avoidance*  
and *psychiatric symptoms* at baseline?





# Does *global experiential avoidance* at baseline predict drug use tests at the end of the induction period?



# Alcohol

Global experiential avoidance **did not** have a reliable prospective association with:

a) *number of positive alcohol tests* at the end of the induction period (RR= 0.995; 95% CI = 0.984, 1.006;  $p = 0.385$ ), or

b) the *likelihood of having a positive test* at the end of the induction period (RR= 0.965; 95% CI = 0.896, 1.038;  $p = 0.336$ ).

# Tobacco

Similarly, global experiential avoidance **did not** have a reliable prospective association with:

a) *number of positive smoking tests* at the end of the induction period (RR= 0.999; 95% CI = 0.99, 1.009;  $p = 0.904$ ) or

b) the *likelihood of having a positive test* at the end of the induction period (RR= 0.997; 95% CI = 0.939, 1.058;  $p = 0.917$ ).

# Illicit drugs

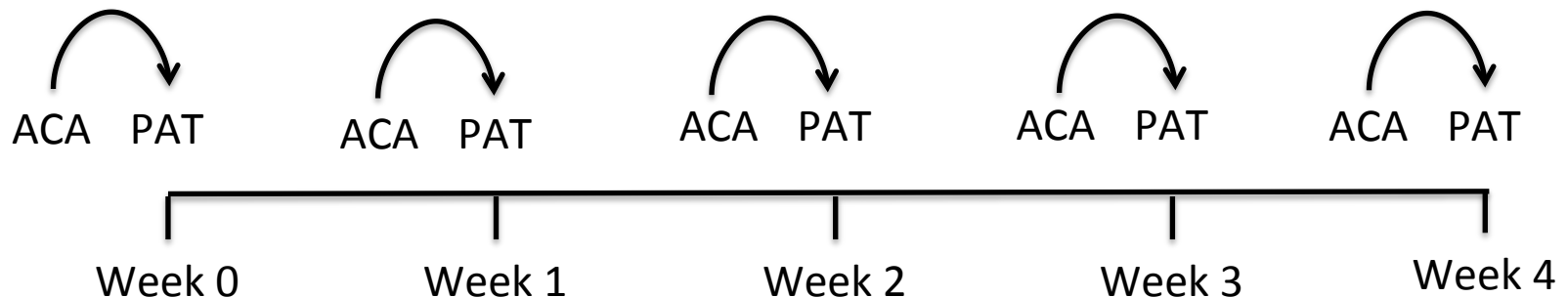
Finally, global experiential avoidance **did not** have a reliable prospective association with:

a) *number of positive illicit drug tests* at the end of the induction period (RR= 0.995; 95% CI = 0.984, 1.005;  $p = 0.316$ ) or

b) the *likelihood of having a positive test* at the end of the induction period (RR= 1.009; 95% CI = 0.957, 1.063;  $p = 0.736$ ).

Is there an association between  
***experiential acceptance*** and  
the likelihood of having  
a positive ***alcohol*** screening test  
throughout the induction period?

Multilevel logistic model



\*ACA: Retrospective Alcohol Cravings Acceptance

\*PAT: Positive Alcohol Screening Test

- ***Above and beyond the intensity of experienced cravings***, experiential acceptance had an association with the likelihood of having a **negative** alcohol screening test.
- A **1-unit increase** in experiential acceptance was associated with a **17% reduction in the odds** of a positive alcohol screen (OR = 0.835; 95% CI = 0.691, 1.01; p = 0.063), although this association is marginally statistically significant.

```

Generalized linear mixed model fit by maximum likelihood ['glmerMod']
Family: binomial ( logit )
Formula: alcohol ~ cravings + accept + (1 | ID)
Data: data.df

          AIC      BIC   logLik deviance
270.952  284.490 -131.476  262.952

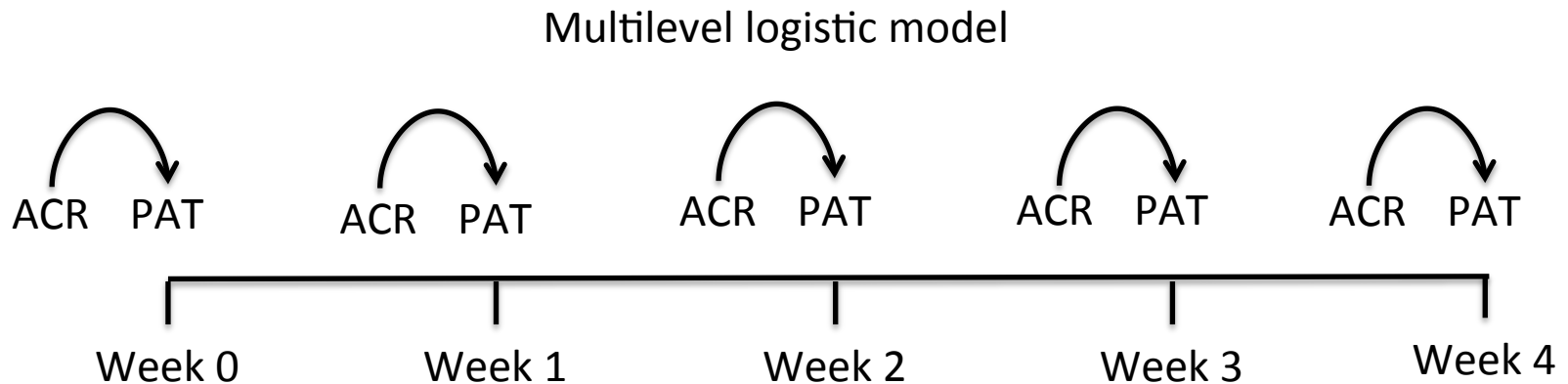
Random effects:
Groups Name      Variance Std.Dev.
ID (Intercept)  4.083    2.021
Number of obs: 218, groups: ID, 71

Fixed effects:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)  0.07423    0.49842   0.149   0.8816
cravings     0.16944    0.10332   1.640   0.1010
accept      -0.17982    0.09669  -1.860   0.0629 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
              (Intr) crvngs
cravings    -0.553
accept     -0.375 -0.306

```

Is there an association between *cognitive reappraisal* and the likelihood of having a positive *alcohol* test throughout the induction period?



\*ACR: Retrospective Alcohol Cravings **Reappraisal**

\*PAT: Positive Alcohol Screening Test

- Above and beyond experiential acceptance and the intensity of experienced cravings, **cognitive reappraisal** has an association with the likelihood of having a **negative** alcohol screening test
- A 1-unit increase in cognitive reappraisal is associated with a **29% reduction in the odds** of a positive alcohol screen (OR = 0.71; 95% CI = 0.557, 0.904; p = 0.002)
- **Improved model fitness:** AIC that goes from 270.952 to 263.838 and this reduction is statistically significant (p = 0.003).

```

Generalized linear mixed model fit by maximum likelihood ['glmerMod']
Family: binomial ( logit )
Formula: alcohol ~ cravings + accept + appraise + (1 | ID)
Data: data.df

           AIC      BIC    logLik deviance
263.8380  280.7605 -126.9190  253.8380

Random effects:
Groups Name      Variance Std.Dev.
ID (Intercept)  4.619    2.149
Number of obs: 218, groups: ID, 71

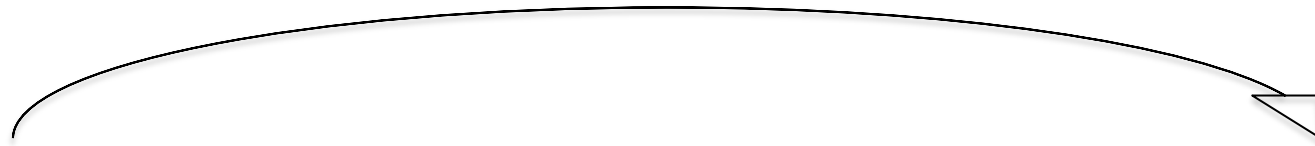
Fixed effects:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)  0.52423    0.54288   0.966  0.33421
cravings     0.22644    0.11218   2.019  0.04352 *
accept      -0.08379    0.10658  -0.786  0.43174
appraise    -0.34314    0.11113  -3.088  0.00202 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) crvngs accept
cravings -0.476
accept   -0.285 -0.251
appraise -0.246 -0.197 -0.247
>

```

# Do *stages of change* at baseline predict number of positive alcohol EtG tests at the end of the induction period?

Unilevel hurdle models



Baseline

Individual levels of ambivalence, recognition and steps

End of induction

1. Number of positive alcohol use tests
2. Any alcohol use test



# Mixed results

Our regression model indicated that ***neither recognition*** (RR= 0.976; 95% CI = 0.932, 1.022; p = 0.303), ***nor ambivalence*** (RR= 0.976; 95% CI = 0.965, 1.104; p = 0.316), ***or steps towards recovery*** (RR= 0.967; 95% CI = 0.927, 1.01; p = 0.128), ***had a reliable prospective association*** with number of positive alcohol tests at the end of the induction period.

***Recognition*** had a marginally statistically significant prospective association with the likelihood of any positive test (**26% reduction in the odds**; OR = 0.745; 95% CI = 0.543, 1.023; p = 0.069)

***Ambivalence*** had a strong association with the likelihood of a positive alcohol test (**76% increase in the odds**; OR = 1.767; 95% CI = 1.163, 2.684; p = 0.008)

***Steps towards recovery*** had a reliable prospective association with the likelihood of a positive alcohol test (**32% decrease in the odds**; OR = 0.686; 95% CI = 0.486, 0.969; p = 0.033)



# Discussion

Strong association between experiential **avoidance** and **psychiatric symptoms** but mixed results on drug use

Experiential avoidance appears to be an **important target** to address in co-occurring disorders, but their role in overall drug use is still unclear

Support for the use of **contextually-based measures** of experiential avoidance.

## **Previous studies:**

experiential acceptance (not reappraisal) > overall functioning

## **Current study:**

Cognitive reappraisal (and acceptance) > alcohol use

## **Lack of a predictive**

**association** between global experiential avoidance and drug use could be influenced by

- (a) Cognitive deficits in SMI
- (b) Lack of precision of global self-reports
- (c) Lack of statistical power

Partial support for the role of **stages of change**. Conceptual similarities between: Steps towards recovery > commitment  
Recognition of problem > awareness

## **Limitations:**

- (a) results are preliminary
- (b) lack of experimental manipulation
- (c) lack of power due to limited sample size

## **Strengths:**

- (a) biological measures of drug use
- (b) prospective longitudinal associations
- (c) state of the art statistical methods

# Future directions

## **Complete recruitment**

from randomized controlled trial (expected sample size: N = 120) and conduct final process analysis

**Stronger focus** on context specific measures of processes of change

Preliminary support to combine ***Contingency Management*** and ***Acceptance and Commitment Therapy*** to enhance long term sustainable outcomes in this population