Item Response Theory analyses of DSM-5 substance use disorder criteria in French outpatient addiction clinic participants

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INTRODUCTION

Addiction is a chronic condition with high general population prevalence and many public health impact. **Quality of diagnostic criteria is important to allow early detection, facilitate access to treatment and reduced public health impact.**

The **current DSM 5 Substance Use Disorder (SUD) criteria** have **good validity**, but further studies are needed:

- to better understand the importance and utility of the 11 current criteria
- determine if they could be simplified for future revisions.

Item Response Theory (IRT) analysis provides important advantages in understanding **item behavior** (Embretson et Reise 2000), but **few studies** among **clinical population** seeking abstinence or use reduction in non-US clinical populations (Hasin, O'Brien et al. 2013, Shmulewitz et al. 2015, Hasin, et al., 2012).

There is some **debate on the addition of craving** for the improvement of SUD diagnosis and the need for all of the current 11 criterion (Hasin, O'Brien et al. 2013).

OBJECTIVE

1. To confirm unidimensionality of the DSM-5 SUD criteria
2. To investigate the relationships of the criteria to each other and the underlying latent trait
3. To determine if the items function differently in sub-groups for alcohol, opiates, cocaine, cannabis, and tobacco in French adult outpatient clinic subjects with a focus on craving

METHODS

Participants

From ADDICTAQUI cohort, Bordeaux, France, including:

– Substance users seeking treatment
– Recruited in French outpatient addiction clinics at their treatment entry
– At least one diagnosis of a SUD
– 18 y.o. and over

	ADDICTAQUI(n=1359)	
Age (mean, SD)	38.6	11.5
Males (n, %)	914	67%
Mood Disorder (n, %)	420	31%
Anxiety Disorder (n, %)	561	42%

Procedure

Face-to-face research interviews by a trained interviewer

Measures

– Mini (International Neuropsychiatric interview) for 11 DSM-5 SUD criteria), Anxiety (at least one current generalized anxiety, panic with/without agoraphobia, social phobia) and Mood (at least one current major depressive and/or bipolar disorder) Disorders
– ASI (Addiction Severity Index) for sociodemographic (age, gender) and substances use

Statistical Analyses (Shmulewitz et al. 2011, Hasin, O'Brien et al. 2012)

Analyses conducted separately for each substance among current users (at least 2 times per week during 12 months): alcohol (n= 787), opiates (n= 131), cocaine (n= 141), cannabis (n= 504) and tobacco (n= 1014)

Dimensionality: fit a one-factor Confirmatory Factor Analysis (CFA), based on the root mean square error of approximation (RMSEA ≤.06) and fit indices (CFI/TLI ≥.95) (Hu et Bentler 1999)

Item Response Theory (IRT) models and Differential Item & Test Functioning (DIF/DTF): the 2-parameter logistic item response theory model to all 11 criteria of DSM-5 SUD:
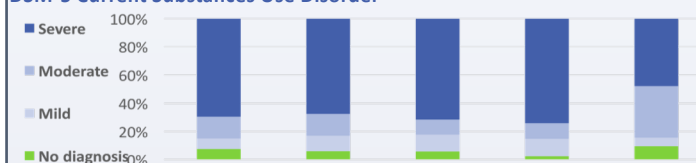- Estimate difficulty and discrimination criteria parameters
- DIF (differences of difficulty parameters) & DTF (average difference in the expected number of criteria for individuals with the same trait severity in different subgroups) by gender, age, mood & anxiety disorder

RESULTS

DSM-5 Current Substances Use Disorder

	Alcohol	Cannabis	Cocaïne	Opiates	Tobacco
Number of endorsed criteria (SD)	6.88 (3.0)	6.69(2.9)	7.22(3.2)	7.37(2.6)	5.04 (2.3)

**Dimensionality:** **Unidimensionality is confirmed,** good fit indices and factor loading:

- **For alcohol, cocaine, opiates, and cannabis, but not for tobacco**

CFA Model fit indices	Alcohol	Opiates	Cocaine	Cannabis	Tobacco
CFI	0.963	0.967	0.995	0.967	0.930
TLI	0.954	0.959	0.993	0.958	0.912
RMSEA	0.057	0.047	0.026	0.048	0.052

- **Craving** loads more strongly (alcohol, 0.83; opiates, 0.84, cocaine, 0.90, cannabis, 0.82 and Tobacco 0.77) than any other criteria

IRT: The items are spread across the severity continuum
- **Craving** has one of the lower difficulty (high frequency, curve on the left) and higher discrimination (steeper slope) than other criteria among the 5 substances
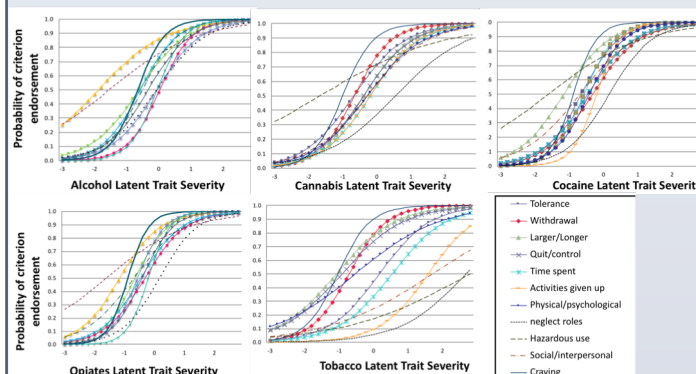
DIF & DTF (alcohol, cannabis and tobacco)

- No DIF was identified for craving for any covariate or substance

- Some items do show DIF, overall this is not expected to change a diagnosis (the DTF <1) for alcohol and cannabis (for all four covariates), and for tobacco for gender and age

- For tobacco, DTF was greater than 1 for mood, anxiety, and the problematic items (those with DIF) were the abuse ones (new criteria)

CONCLUSION

- **The DSM-5 criteria** are generally valid, no DIF that would impact diagnosis, in non-US clinical sample

  → An exception for tobacco, specifically the former abuse criteria: need further studies

- **Craving criterion** showed high prevalence, high discrimination, no DIF, and added information for tobacco: **most selective** across substances

- Other items redundant with craving (but with less discrimination, less informative) could be removed

Further studies are needed to determine the specific role of craving in diagnosing SUD: Could craving be sufficient?