Are DSM-5 substance use disorder criteria influenced by user treatment environment? An Item Response Theory analyses approach.

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INTRODUCTION

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

The **current DSM 5 Substance Use Disorder (SUD) criteria** have **good validity**

Item Response Theory (IRT) analysis provides important advantages in understanding **item behavior** *(Embretson et Reise 2000),* and indicated a valuable addition of craving in clinical sample *(Kervran et al. 2019, Chung et al. 2012)*

Some of the diagnostic criteria had different prevalence across treatment context and use, suggesting a differential criteria functioning.

Further studies are needed to test the validity across clinical practices, context of use and treatment *(Cherpitel et al. 2010)*

We chose harm reduction program (HR) participants to model subjects with significant probability of having a substance use disorder, actively engaged in use, recruited outside of an clinical treatment environment.

OBJECTIVE

To test the differential criteria and SUD functioning for alcohol, opiates, cocaine, cannabis and tobacco use by treatment environment: substance users recruited in outpatient addiction clinic (TX) vs harm reduction program (HR)

METHODS

Participants

TX 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	HR participants from COSINUS cohort, Bordeaux, France, including: – Regular substances users – Recruited in Harm reduction program – Injected at least once during the last month

Age (mean, SD)	38.2	11.3
Males (n, %)	1013	68%

Procedure
Face-to-face research interviews by a trained interviewer

Measures
– MINI (Mini International Neuropsychiatric interview) for 11 DSM-5 SUD criteria
– ASI (Addiction Severity Index) for sociodemographic (age, gender) and substances use

Statistical Analyses
Analyses conducted separately for each substance among current users (at least 2 times per week during 12 months)

	Alcohol	Cannabis	Cocaine	Opiates	Tobacco
HR	89	95	82	102	128
TX	787	504	141	131	1014
Total	**876**	**599**	**223**	**233**	**1142**

Dimensionality & Item Response Theory (IRT) models :
– 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)
– 2-parameter logistic IRT model to all 11 criteria of DSM-5 SUD: Estimate difficulty and discrimination criteria parameters *(Hu et Bentler 1999)*

Differential Item & Test Functioning (DIF/DTF):
– Multiple indicator multiple cause (MIMIC) structural equation models to test for DIF by treatment environment: each criterion set was modeled as a latent variable indicated by the 11 criteria and regressed on treatment environment (TX vs HR) age, gender, level of education, and poly-addiction
– DTF (average difference in the expected number of criteria for individuals with the same trait severity in different subgroups) by treatment environment (HR vs TX)

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RESULTS

DSM-5 Current Substance Use Disorder
The prevalence of SUD was very high for each substance among current regular users: alcohol 93%, opiates 98%, cocaine 92%, cannabis 92% and tobacco 89%
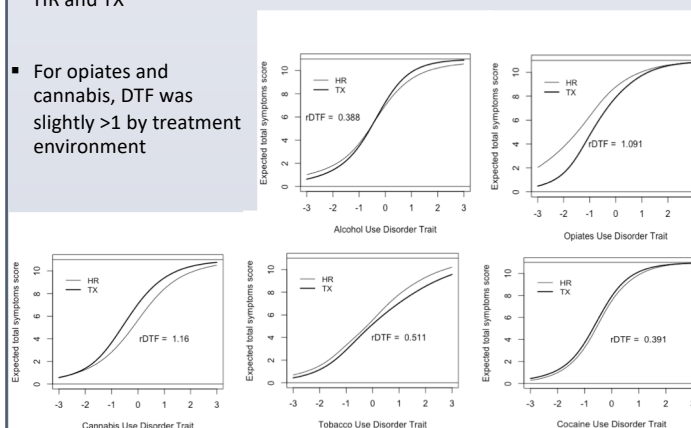
Dimensionality & IRT:

- **Unidimensionality is confirmed,** good fit indices and factor loading **for alcohol, cocaine, opiates, and cannabis, but not for tobacco**

- **Craving criterion:**
  - loads more strongly (alcohol: 0.83; opiates: 0.84, cocaine: 0.90, cannabis: 0.82 and Tobacco: 0.77) than any other criteria
  - has one of the lower difficulty (high frequency) & higher discrimination than other criteria among the 5 substances

DIF & DTF by treatment environment (HR vs TX)

- **No DIF** was identified for "craving", "Large amount", "time spent", "tolerance" and "activities given up" criteria by treatment environment

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

- For opiates and cannabis, DTF was slightly >1 by treatment environment

	Criteria	TX	HR
Loss of control	Large amount/longer	No DIF	
	Quit/Control	Cannabis & Tobacco	
		+	-
	Time spent	No DIF	
	Craving	No DIF	
Social Impairment	Activities given up	No DIF	
	Social/interpersonal problems	Cannabis	
		-	+
	Neglect role	Tobacco	
		-	+
Risky use	Hazardous use	Tobacco	
		-	+
	Psychological/Physical problems	Tobacco	
		+	-
Pharmacological adaptation	Tolerance	No DIF	
	Withdrawal	Cocaine	
		+	-

CONCLUSION

- Craving criterion showed high prevalence, low difficulty and high discrimination: potential usefulness as an early indicator of SUD

- The criteria of loss of control dimension of SUD had similar functioning by treatment environment for alcohol, opiates, cocaine, cannabis and tobacco: except for "quit/control" criterion

- HR participants were more severe for opiates use disorder, than TX patients, without specificities on criteria endorsement (no DIF)

- DIF seems to impact the total expected number endorsed cannabis criteria

No significant DIF across context of addiction treatment, indicating that "craving" criterion is very specific and stable among problematic substances users regardless the context of use and treatment