#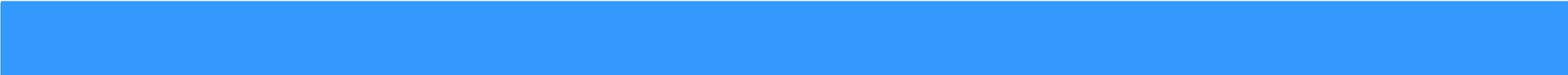 Factors mediating the effectiveness of a school-based intervention to prevent substance use in adolescence ("Unplugged")

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Unplugged

- Universal school-based program for preventing tobacco, substance use and alcohol abuse among adolescents
- Based on *social influence* approach

- It includes the following components
  - Social skills
  - Personal skills
  - Knowledge
  - Normative education

- It is administered by **teachers** trained in a 3-days course

- It is made by **12 units**, 1 hour each

- It is designed for **12-14 years old** students

- It was tested through a **randomized controlled trial** in 7 European countries in 2004-2007 school years
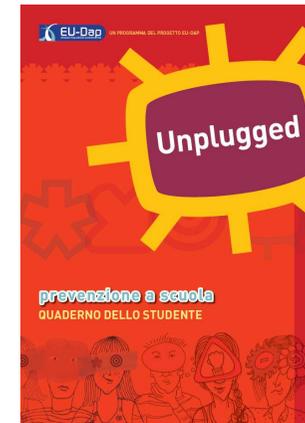
The EU-Dap trial

- 170 schools were randomly assigned either to one of three experimental arms (Unplugged alone, complemented by parents seminars or peer sessions) or to a control group receiving the usual health education curriculum

- **7079** students of 143 schools participated in the *baseline survey* (November 2004)

- The program **("Unplugged")** was administered between November 2004 and February 2005 in the intervention arms

- **6604** (93%) students participated in the *first follow-up survey* (May 2005), 3 months (at least) after the end of the program

- **5812** (82%) students participated in the *second follow-up survey* (May 2006), 15 months (at least) after the end of the program

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Unplugged effectiveness on use outcomes

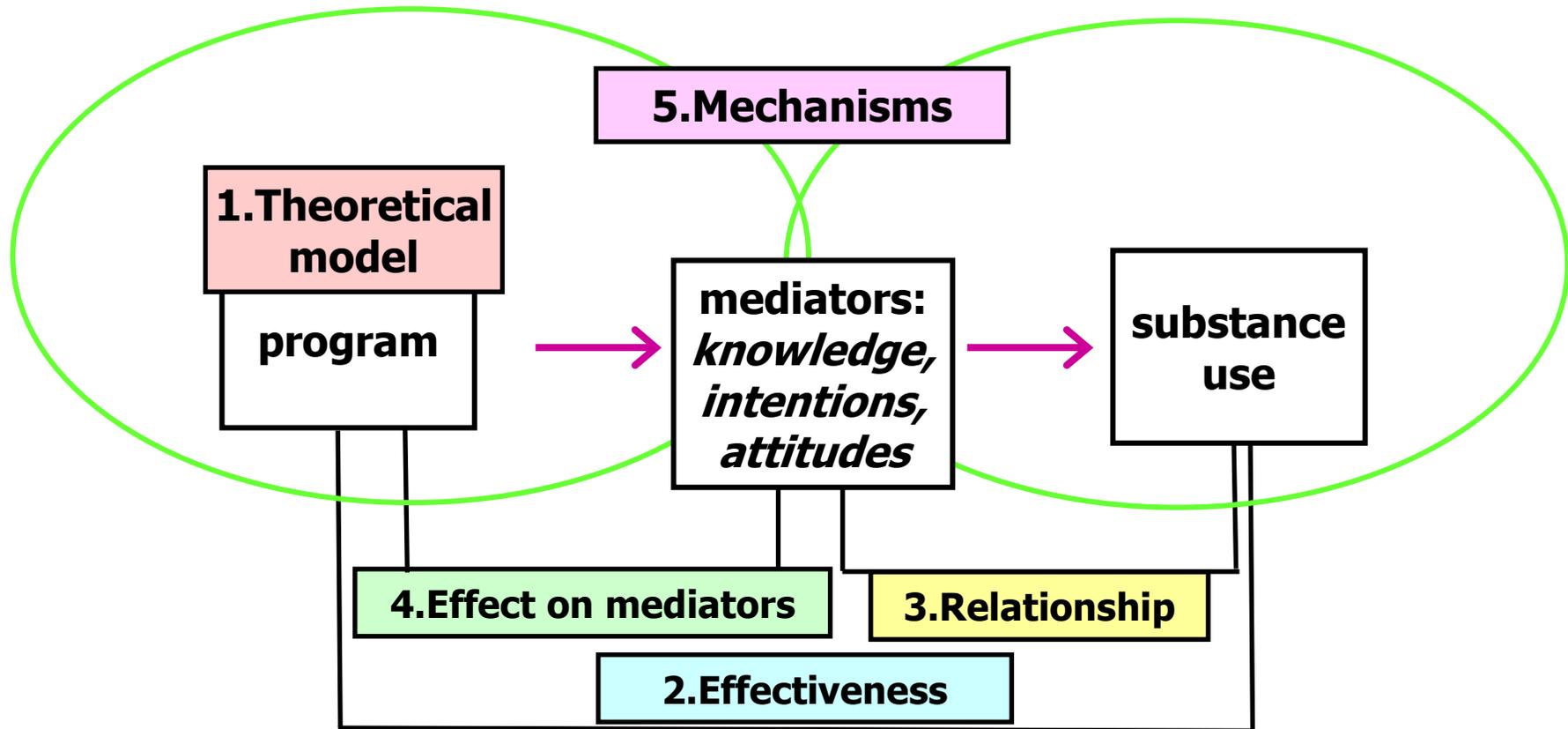Cluster RCT, 7 EU countries participating

Unplugged vs control group (usual curriculum)

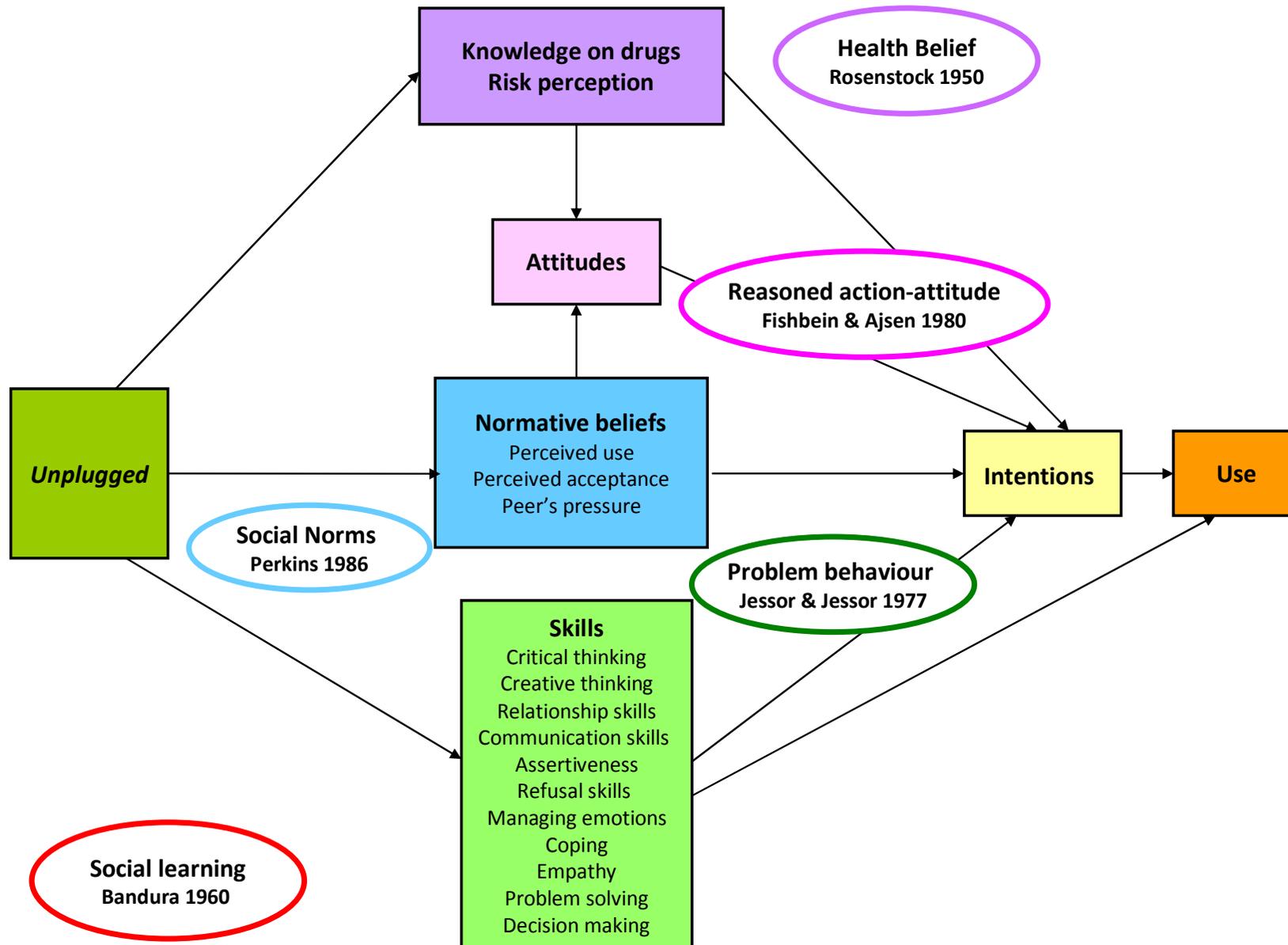Outcomes at 3 and 15 months after the end of the program

Prevalence Odds Ratios estimated through multilevel adjusted models

BAS vs FUP1	Controls n/N	Interventions n/N	Adjusted POR (95%CI) 3 months	15 months
ALO smoking	605/2968	496/2979	0.88 (0.71-1.08)	0.94 (0,80-1,11)
Regular smoking	387/2968	297/2979	0.86 (0.67-1.10)	0.89 (0,72-1,09)
Daily smoking	277/2968	193/2979	**0.70 (0.52-0.94)**	0.92 (0,73-1,16)
ALO drunkenness	353/3054	253/3083	**0.72 (0.58-0.90)**	**0.80 (0,67-0,97)**
Regular drunkenness	120/3054	76/3083	**0.69 (0.48-0.99)**	**0.62 (0,47-0,81)**
ALO cannabis	225/3130	152/3150	**0.77 (0.60-1.00)**	0.83 (0,65-1,05)
Regular cannabis	137/3130	88/3150	0.76 (0.53-1.09)	0.74 (0,53-1,01)
ALO drugs	293/3156	222/3185	0.89 (0.69-1.15)	0.85 (0,69-1,05)

Study of mechanisms of effect

The theoretical model of Unplugged

Knowledge on drugs
Risk perception

Health Belief
Rosenstock 1950

Attitudes

Reasoned action-attitude
Fishbein & Ajsen 1980

Unplugged

Normative beliefs
Perceived use
Perceived acceptance
Peer's pressure

Social Norms
Perkins 1986

Intentions

Use

Problem behaviour
Jessor & Jessor 1977

Skills
Critical thinking
Creative thinking
Relationship skills
Communication skills
Assertiveness
Refusal skills
Managing emotions
Coping
Empathy
Problem solving
Decision making

Social learning
Bandura 1960

Analysis of mechanisms of effect

- **Starting from the theoretical model of the program, we decided to perform mediation analysis to investigate mechanisms of effect of the program at short term**

- A **Multilevel path analysis** in MPlus 6 (Muthén, 1998-2010) was performed.

- As the randomization occurred at school level, school was entered as second level of the model, while individual was entered as first level.

- To control for variability across centers, the stratification option in Mplus was used.

- The total indirect effects of the intervention and the single indirect effect were computed for each mediator, using the IND command on Mplus.
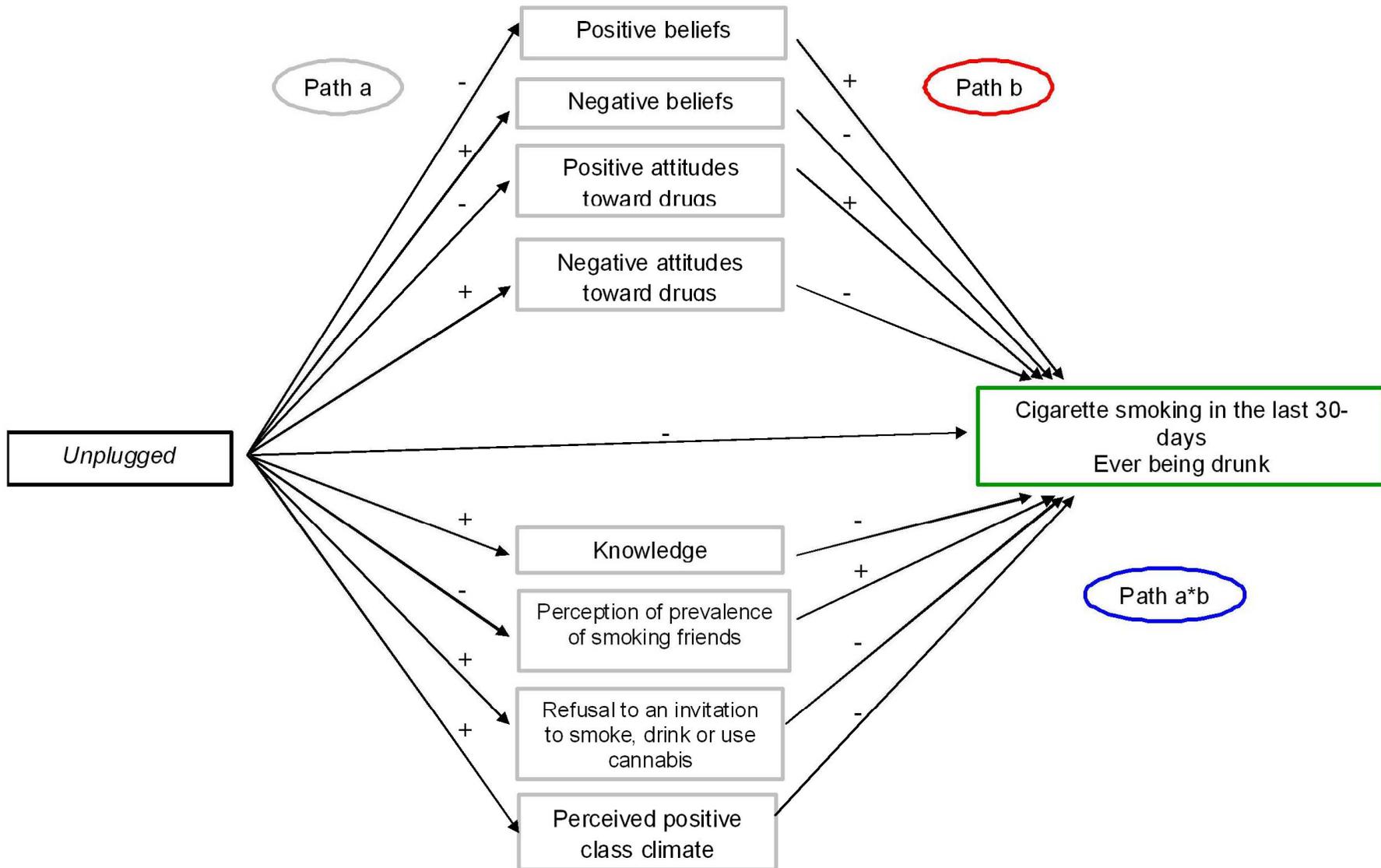
Effectiveness on mediators (Path a)

Mediator	Path a β (S.E.)	p value
Youth cigarettes use in the past 30 days		
Positive attitudes towards drugs	-.041 (.020)	.038
Negative attitudes towards drugs	-	n.s.
Positive beliefs tobacco	-.044 (.021)	.034
Negative beliefs tobacco	-.029 (.017)	.086
Knowledge about tobacco	.049 (.021)	.022
Refusal skills tobacco	-.030 (.015)	.040
Perception of number of smokers friends	-.051 (.020)	.010
Perception of positive class climate	-.047 (.021)	.022
Youth's ever being drunk		
Positive attitudes towards drugs	-.040 (.019)	.036
Negative attitudes towards drugs	-	n.s.
Positive beliefs alcohol	-.038 (.018)	.040
Negative beliefs alcohol	-	n.s.
Knowledge about alcohol	.153 (.017)	.000
Refusal skills alcohol	-.032 (.018)	.072
Perception of number of drunk friends	-	n.s.
Perception of positive class climate	-.047 (.021)	.022
Youth's ever use of cannabis		
Positive attitudes towards drugs	-.041 (.021)	.044
Negative attitudes towards drugs	-	n.s.
Positive beliefs cannabis	-.050 (.019)	.006
Negative beliefs cannabis	-	n.s.
Knowledge about cannabis	.137 (.022)	.000
Refusal skills cannabis	-.033 (.019)	.074
Perception of number of users friends	-.042 (.020)	.034
Perception of positive class climate	-.048 (.021)	.022

Mediators of effect (Path a*b) – whole sample

Reduction of <u>positive attitudes towards drugs</u>, improvement of <u>refusal skills</u> and reduction of <u>perception of prevalence of users friends</u> are mediators of program effects

Mediators (Path a*b)	Tobacco p value	Drunkenness p value	Cannabis p value
Positive attitudes towards drugs	.070	.046	.060
Negative attitudes towards drugs	n.s.	n.s.	n.s.
Positive beliefs	n.s.	.096	n.s.
Negative beliefs	n.s.	n.s.	n.s.
Knowledge	n.s.	n.s.	n.s.
Refusal skills	.040	.078	.078
Perception of number of users friends	.016	n.s.	.048
School climate	n.s.	n.s.	n.s.

Standardized effects (β and standard errors) of path a, path b, and path a*b of multilevel multiple mediation models on use (controlling for age, gender, and baseline levels of mediators and outcome), short term follow-up.

Mediators of effect (Path a*b) – users

The same factors seem to be mediators of program effects among users, less convincing for cannabis

Mediators (Path a*b)	Tobacco p value	Drunkenness p value	Cannabis p value
Positive attitudes towards drugs	0.044	0.008	n.s.
Negative attitudes towards drugs	n.s.	n.s.	0.096
Positive beliefs	n.s.	0.038	n.s.
Negative beliefs	n.s.	n.s.	n.s.
Knowledge	n.s.	n.s.	0.090
Refusal skills	0.066	0.094	n.s.
Perception of number of users friends	0.044	0.076	n.s.
School climate	n.s.	n.s.	n.s.

Standardized effects (β and standard errors) of path a, path b, and path a*b of multilevel multiple mediation models on use (controlling for age, gender, and baseline levels of mediators and outcome), short term follow-up.

Mediators of effect (Path a*b) – abstainers

Among abstainers, only <u>perception of number of users friends</u> appear to be a mediator

Mediators (Path a*b)	Tobacco p value	Drunkenness p value	Cannabis p value
Positive attitudes towards drugs	n.s.	n.s.	n.s.
Negative attitudes towards drugs	n.s.	n.s.	n.s.
Positive beliefs	n.s.	n.s.	n.s.
Negative beliefs	n.s.	n.s.	n.s.
Knowledge	0.070	n.s.	n.s.
Refusal skills	n.s.	n.s.	n.s.
Perception of number of users friends	0.058	n.s.	0.084
School climate	n.s.	n.s.	n.s.

Standardized effects (β and standard errors) of path a, path b, and path a*b of multilevel multiple mediation models on use (controlling for age, gender, and baseline levels of mediators and outcome), short term follow-up.

Conclusions

- **the intervention significantly affected many of the expected mediating mechanisms, namely, expectations, attitudes, normative prevalence of substance use, refusal skills, school climate, and knowledge**

- However, only few of them resulted to be **real mediators of the intervention effects**

- Specifically, an increase in **refusal skills**, a decrease in positive **attitudes toward drugs** and a decrease of **perception of users friends** appear to consistent mediators for the 3 classes of substances

- Limitations can have affected the identification of mediators: short term effect, concurrent measure of mediator and outcomes, small effects, moderators (7 countries)
  - ☐ It is needed to replicate the analysis using 3 waves

Implications

- **Three main classes of mediators** were identified:
  - ☐ Generic attitudes towards drugs
  - ☐ Refusal skills
  - ☐ Normative perceptions

- When building new interventions, these should be the **targeted mediators** of the intervention
- Targeting other possible mediators (knowledge, risk perception) may not contribute to the effect of the programs

- There is a weak indication that increasing **knowledge** can increase the risk of cannabis use:
  - ☐ The role of knowledge in prevention intervention should be more carefully studied
  - ☐ This is a constant component of prevention interventions, but no evidence of effect of such component has been demonstrated

RUNNING HEAD: Mediating factors of a school-based intervention

Title: **Short- term mediating factors of a school-based intervention to prevent youth substance use in Europe**

Authors:

Giannotta F[1], Vigna-Taglianti FD[2,3], Galanti MR[4,5], Scatigna M[6], Faggiano F[3,7], and the EU-Dap Study Group[a].

- The paper has been accepted for publication in Journal of Adolescent Health
- www.eudap.net

Thanks for your attention!