The economics and value of prevention

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The paradigm of prevention
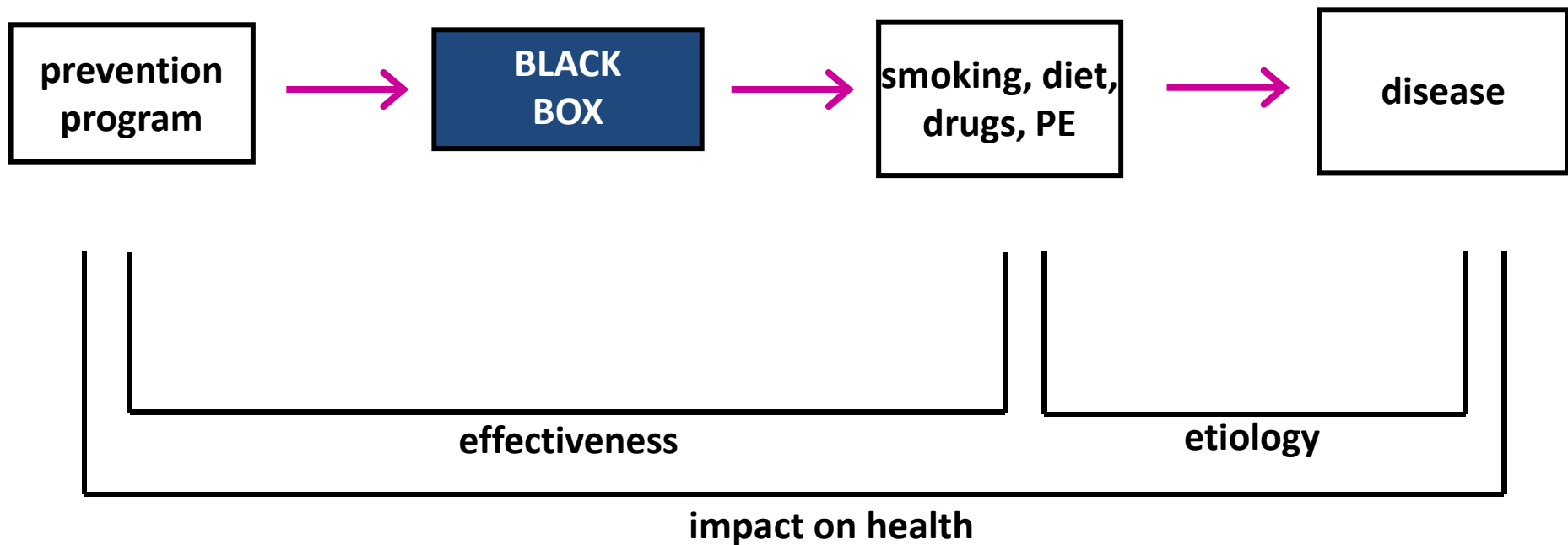
What is there in the black box?

- A constellation of *factors that can determinate risky behaviours*
- (targets of many prevention programs -> mediators)

1. *Individual factors*
   - Character traits
     - impulsivity, sensation seeking, hopelessness, anxiety sensitivity
   - Knowledge about risks
   - ….

2. *Environmental factors*
   - Mass media (advertisements, films, TV)
   - Peer and family influence
   - Other models (teachers, health professionals, politicians)
   - Availability and accessibility
   - ….

Theoretical approaches

- *Reasoned action attitude* (Fishbein and Ajzen in 1980) / *Health belief model* (Rosenstock 1950) – *Human behaviour is rational.* **Perceived risks and benefits for health are the key factors in motivating the action**

- *Social learning theory* (Bandura 1977) / *Social norms theory* (Campbell, 1964; Durkheim, 1951, Perkins 1986) – **People tend to adopt the attitudes of the group** *and act in accordance with group expectations.*

- *Psychological vulnerability* (Sher, 2000) - *Personality factors (hopelessness, anxiety sensitivity, **impulsivity, and sensation seeking) are predictive risk factors for substance misuse** in adolescence

From complexity to... complexity

- *Risk factors* and theories are the base for the identification of *MEDIATORS*
- A mediator is the factor targeted by the prevention programme
- Prevention programmes often have *different components for different mediators*
- Many targeted mediators = many components

However, complexity isn't rational...

- In his brilliant review of 48 effective US programs of substance use prevention (*Health education research 2007*; *22:* 351-60), Hansen showed that:
  - *programs are not truly theory driven*
  - even when they are, they *do not adhere usually to theory's principles.*
  - Moreover, he identified at least *23 content areas addressed by programs* (=programs' ingredients)
  - in average *programs addressed 8.5 content areas each*

Theoretical model of Unplugged

Van der Kreeft, DEPP, 2007
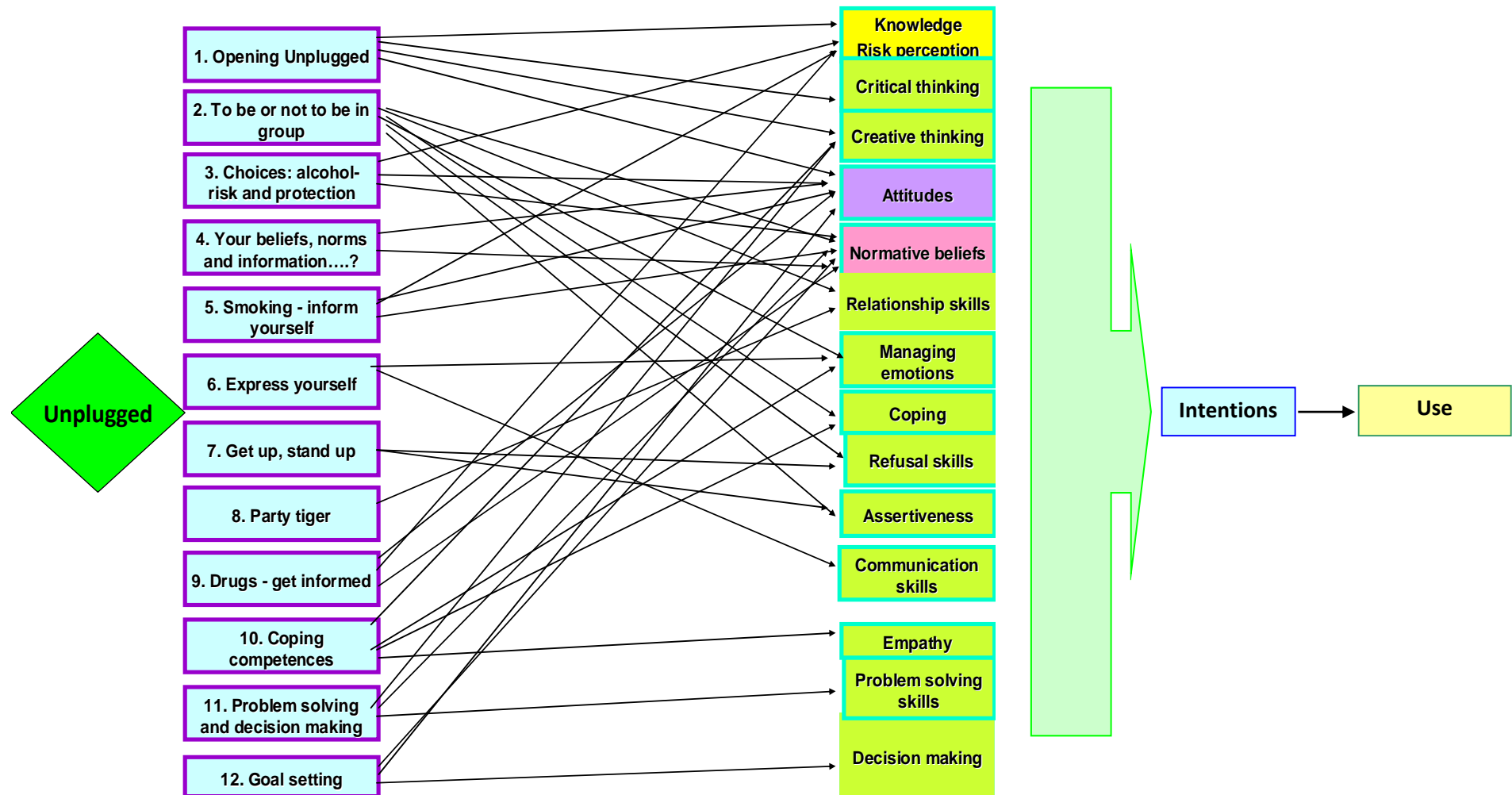
A selection of E-B programs for drug prevention

Intervention	N. of comp.	Type of components
Keepin'it REAL (KIR)	11	10 CST + booster activities + media campaign (TV/radio spots)
Unplugged	12	12 CST
Towards No Drug Abuse (TND)	12	12 CST
Skills for Adolescence (SFA)	40	40 CST
Good Behavior Game (GBG)	1	1-2?
Preventing alcohol use in adolescence (PAS)	6	5 CST + 1 parent meeting
Project Northland	35	31 CST in 6 years + parental involvement + media campaign + peer action teams + community action teams
All Stars	35	13 core CST + 9 booster CST + 12 plus CST + parental education and involvement
School-based alcohol education	6	4 CST + student booklet + parent booklet
PreVenture	2-3	in-class screening + 2 CST
School-Based Substance Abuse Prev. Program	15	15 CST
Life Skill Training (LST)	30	15 core CST + 15 booster CST

- The evaluation study (usually a **RCT**) is able to measure the whole effect of the program (on mediators and) on the final outcome.

- But, it is **not possible to disentangle the role of each component** in the final program effect.

Mediation model of Unplugged
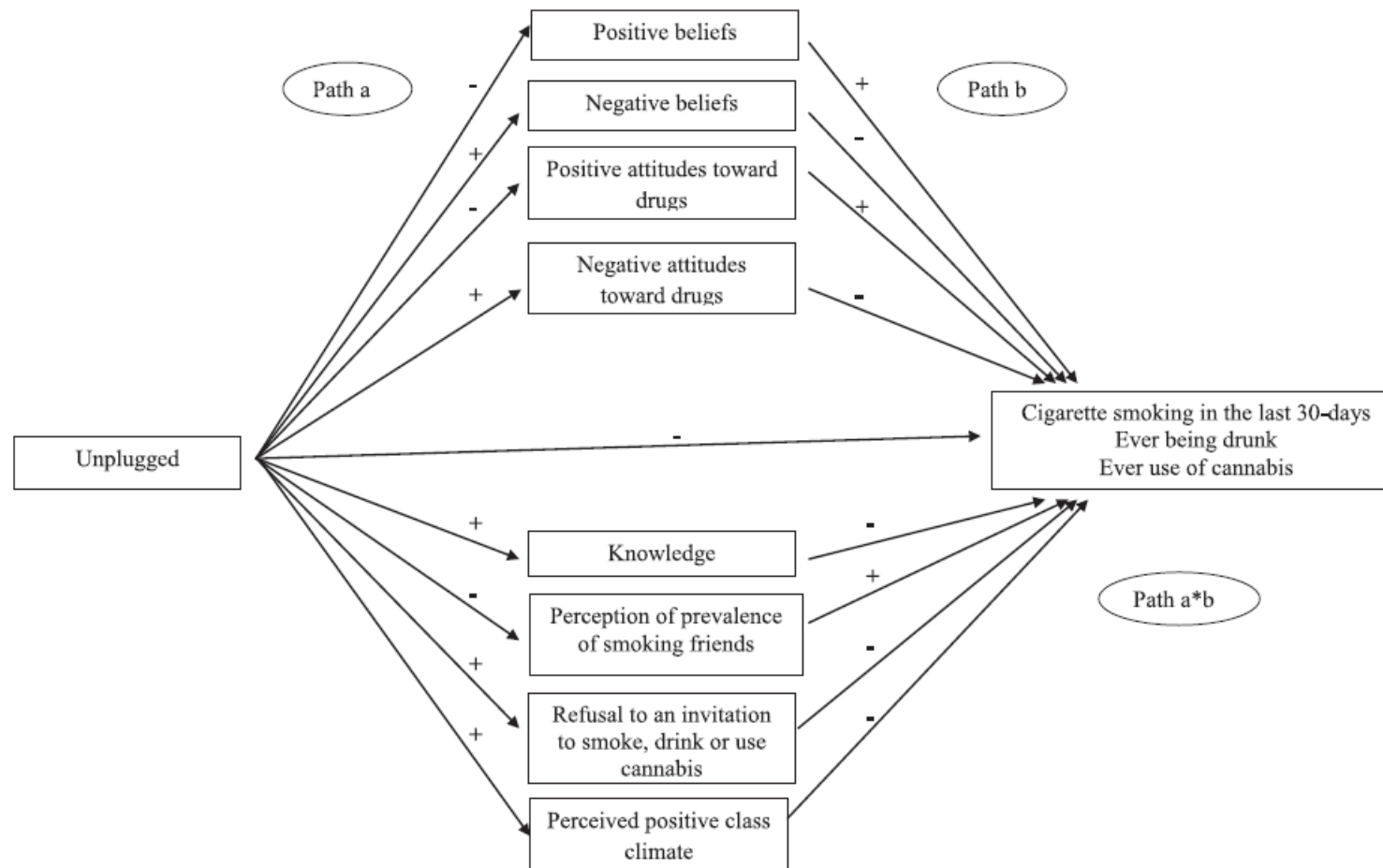
Path a: effect of the intervention on targeted mediators
Path b: effect of targeted mediators on substance use
Path a*b: mediation effect of targeted mediators

Giannotta. J Adolesc Health 2014; 54: 565-73

Effect of Unplugged on mediators

Mediator	Path a		Path b		Path a*b	
	β (SE)	p Value	β (SE)	p Value	β (SE)	p Value
Whole sample (n = 6,972), direct effect: β −.018; SE .011; p = .090						
Positive attitudes toward drugs	.041 (.021)	.044	.121 (.016)	.000	.005 (.003)	.060
Negative attitudes toward drugs		n.s.	.042 (.012)	.000		n.s.
Positive beliefs toward cannabis	−.050 (.019)	.008		n.s.		n.s.
Negative beliefs toward cannabis		n.s.	.044 (.012)	.000		n.s.
Knowledge about cannabis	.137 (.022)	.000		n.s.		n.s.
Refusal skills for cannabis	.033 (.019)	.074	.180 (.016)	.000	.006 (.003)	.070
Perception of number of friends who use	−.042 (.020)	.034	.048 (.008)	.000	−.002 (.001)	.048
Perception of positive class climate	−.047 (.021)	.022		n.s.		n.s.
Never−users lifetime (n = 6,358), direct effect: β −.025; SE .001; p = .090						
Positive attitudes toward drugs		n.s.	.149 (.022)	.000		n.s.
Negative attitudes toward drugs		n.s.	.039 (.020)	.050		n.s.
Positive beliefs toward cannabis	−.045 (.019)	.014		n.s.		n.s.
Negative beliefs toward cannabis		n.s.	.060 (.019)	.002		n.s.
Knowledge about cannabis	.141 (.023)	.000		n.s.		n.s.
Refusal skills for cannabis		n.s.	.217 (.025)	.000		n.s.
Perception of number of friends who use	−.035 (.019)	.066	.053 (.011)	.000	−.002 (.001)	.084
Perception of positive class climate	−.053 (.021)	.012		n.s.		n.s.
Ever-users lifetime (n = 614), direct effect: n.s.						
Positive attitudes toward drugs	−.137 (.047)	.004	.106 (.054)	.026		n.s.
Negative attitudes toward drugs	−.111 (.051)	.030	.094 (.042)	.050	−.010 (.006)	.096
Positive beliefs toward cannabis	−.085 (.048)	.076		n.s.		n.s.
Negative beliefs toward cannabis		n.s.		n.s.		n.s.
Knowledge about cannabis	.130 (.050)	.010	.054 (.030)	.070	.007 (.004)	.090
Refusal skills for cannabis		n.s.	.247 (.046)	.000		n.s.
Perception of number of friends who use	−.081 (.048)	.094	.109 (.036)	.002		n.s.
Perception of positive class climate		n.s.		n.s.		n.s.

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Mediation analysis is not enough

- Mediation analysis is essential to evaluate the **programme effect on mediators**,
- but it is not useful to identify the role of each programme component

Limits of high quality evidence in prevention

RCT can just measure the effect of the whole programme

- It's *impossible to disentangle the role of components*
- It is impossible to know which component actually works and which does not work
- No way to OPTIMIZE a prevention programme by:
  - dropping ineffective (or iatrogenic) components
  - enhancing effective components
- No way to build new interventions on components known to be effective

Most

The only method to measure the role of each programme component on the whole programme effectiveness is MOST