

# Screening with Meaning

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### **New Directions in the Development of Gambling Risk Measures** *Improving the Accuracy and Functionality of Risk Measurement*

**July 3, 2008**  
**7<sup>th</sup> European Conference on  
Gambling Studies and Policy Issues**  
**Nova Gorica, Slovenia**







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# Problem Gambling Measurement

- Traditional Problem Gambling Screens
  - *E.g. South Oaks Gambling Screen (Sogs), DSM IV (Diagnostic and Statistical Manual), Canadian Problem Gambling Index (CPGI)*
- Diagnostic or clinical tool for identifying problem gamblers among treatment population
  - *The person in front of the counselor is probably a problem gambler*
  - *All instruments will identify this person with high degree of accuracy*
- Designed based on available historical research and theory at the time of development
  - *Psychology, Addiction Theory*
  - *Horse racing, casino (Action Gamblers)*

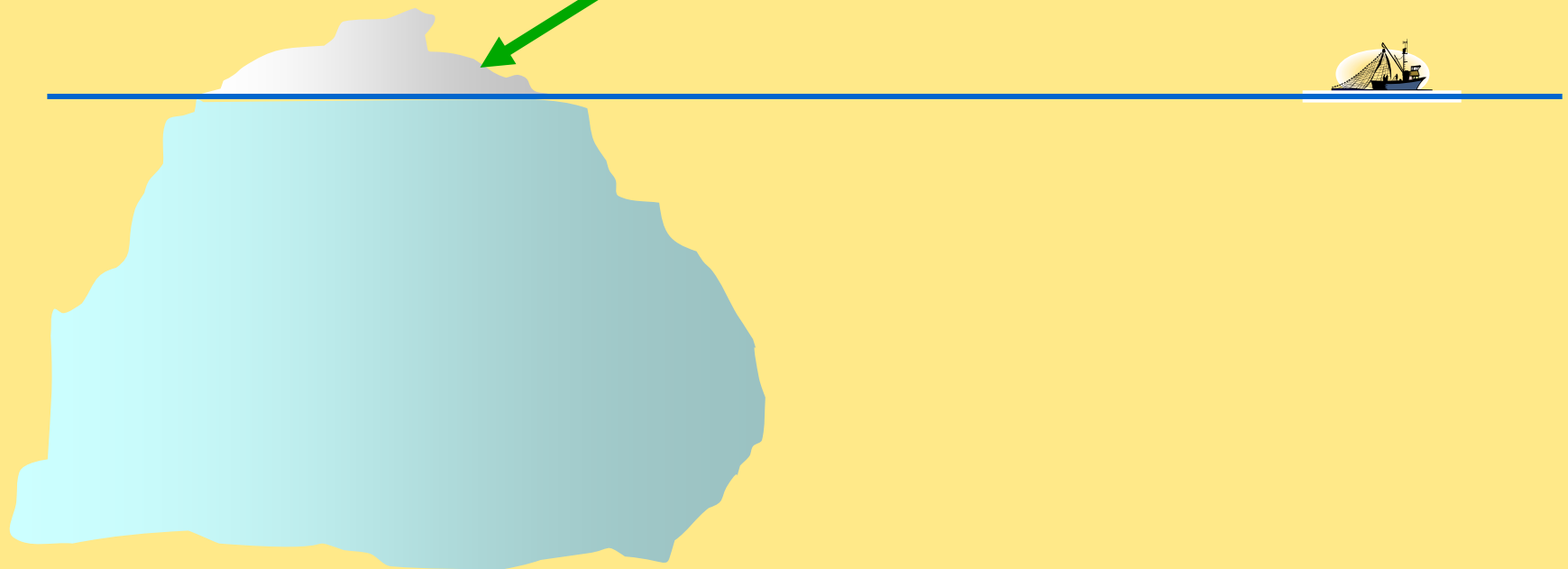
# Applications and Performance of Instruments

<b>Identification of Problem Gamblers (clinical)</b>	
<b>Treatment Intervention</b>	
<b>Prevalence</b>	
<b>Social/Health Policy</b>	
<b>Responsible Gaming</b>	
<b>Prevention</b>	

# Iceberg Principle of Gambling Research

Visibility of Problem  
and At-Risk  
Gamblers

*The severe problem, co-morbid,  
self presenting, pathological  
gambler*



# Iceberg Principle of Gambling Research

Research published on

- Causes and characteristics of problem gamblers are skewed towards treatment populations.
- Theories about who is at-risk are distorted because we use the development profile of this group to generalize to all players
- This is not evidenced based research for general public policy, or general public health policy

# Fundamental Shift: *Prevention versus Identification; Risk versus Problem Gambling*

- Expansion of gambling
  - *Different Products, delivery systems, distribution*
- Changes in technology
  - *Changes in customer interaction – ways of betting*
- Changes in research focus and information
  - *Learning about gambling behaviours and impacts below the water-line*
  - *multi-disciplinary approaches*
- Impact of non-clinical gambling problems
  - *Individuals, Families, Community,*
  - *Judicial, Regulatory*
- Advent of Public Health Models
  - *Social Policy*
  - *Management and Operations*
  - *Assessment and Evaluation*
  - *Evidence-based*

# Addressing Diverse Stakeholders needs

- All Stakeholders
  - *Risk factors*
  - *Program evaluation*
  - *On-going monitoring*
- Health Promotion and Prevention
  - *Education and awareness*
  - *Services Use*
  - *Treatment*
  - *Prevalence*
- Policy and Operational Impact
  - *Type of gambling*
  - *Distribution*
  - *Density*
  - *Spend Cycle*
  - *Type of Venue*
  - *linked jackpots*
  - *Payout a function of play behaviour*

*There are diverse  
and shared needs  
for measuring  
problem Gambling  
and Associated  
Risk*

# Desired Improvements (Top 10)

1. Improved accuracy and sensitivity to changes in gambler
2. Wider specification (coverage of antecedents and consequences)
3. Improved understanding of epistemic (direction of causality) nature of gambling measures
4. More functionality
5. More diagnostic
6. Easier to administer
7. Better definition of conditions for labeling someone as at-risk
8. Individual item threshold, differentiate consequences of *frequent gambling from problem gambling*
9. Appropriate for different player/population segments
10. Appropriate for specific types of gambling



# So...How do we do it?

- There have been substantive advances in measurement development recently
  - **Use of Formative Constructs**
  - **Minimizing Method Bias**

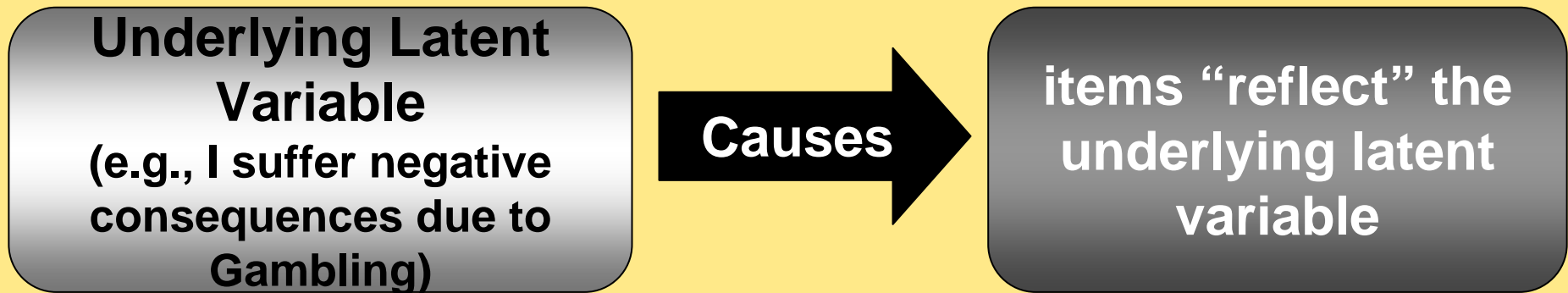
# So...How do we do it?

- Better measure construction
  - Design constructs as either Formative or Reflective – but do it right
  - Minimizing Method Bias
- Better model construction
  - Use higher order models
- Better theory
  - What is risk of problem gambling?
- Appropriate for and applied to a broad spectrum of the population
  - Does it work for infrequent as well as frequent gamblers?

# Reflective to Formative Construct Construction

- Working with OPGRC to develop procedures for designing *formative* constructs in gambling
- Traditionally PG constructs developed and tested assuming they are *reflective* measures

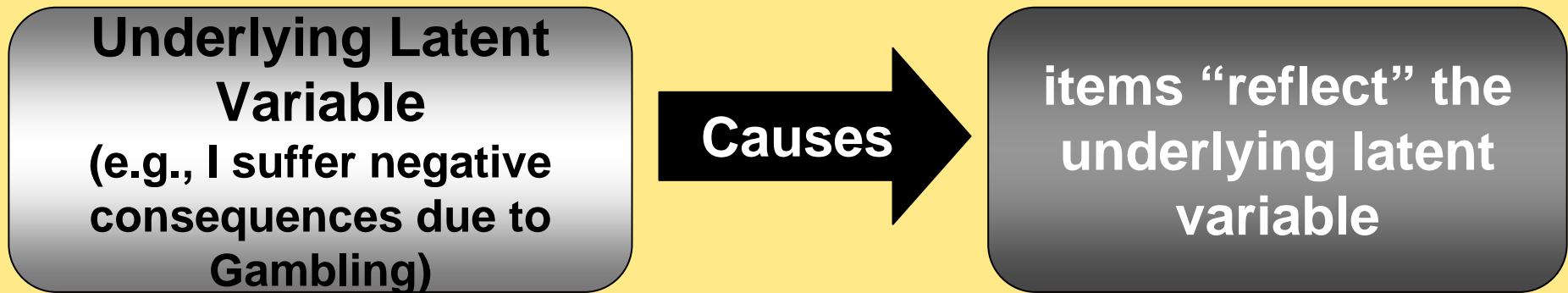
# Reflective Construct Assumption



## Example of a true **Reflective Construct**

1. **My gambling causes me to suffer negative consequences.**
2. **I continue to gamble despite the problems it causes.**
3. **Gambling has become a curse for me.**
4. **There have been unfortunate consequences because of my gambling**

# Reflective Construct Assumption



- Construct is viewed as measuring a single latent variable
- Items in the measure therefore are interchangeable (all measuring same thing)
- Reducing or adding items does not change what is measured (i.e., whether you are suffering consequences or not).
- Relies more on factor analysis than theory to arrive at the final list of items in the construct (only high loading items are selected).

# Therefore....

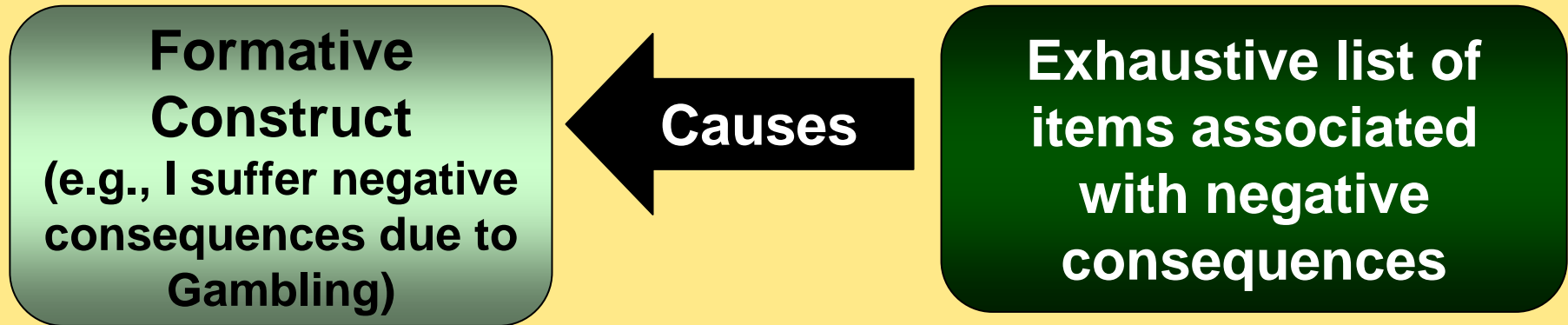
- A higher sum means we are more **confident** that they are suffering consequences – NOT that they are suffering greater consequences.
- Remember – taking out an item does not change the measure. Therefore whether a person scores on four or eight of the items we should still assign them to the same category. We just have less confidence if they score 4.
- Therefore – **we cannot use** the summated score of a reflective measure to assign individuals to different categories of risk etc. – It is not a continuum of severity!

# Formative Construct Assumption



- Construct is viewed as a list of items relevant to the topic (they are not expected to be highly correlated with each other and in fact should not be - we do not use Cronbach's Alpha to test for internal consistency).
- Items in the measure therefore are not interchangeable and is defined by the list itself
- Reducing or adding items changes what is measured
- Has the potential to be more inclusive, more useful

# Formative Construct Assumption



## Example of a true **Formative Construct**

1. I have to borrow from others to continue gambling.
2. My relationship with my family is strained because of my gambling.
3. I have nightmares due to my gambling.
4. My social life suffers due to my gambling.



# As well ...

- Both reflective and formative constructs can measure whether the person is suffering consequences – one is input (formative) the other is output (reflective).
- Formative has strengths though
  - **List determines classification – better for screens (Less onus on responder to judge themselves as it is a list of more objective criteria).**
  - **More information is gained by analyst – what consequences are they suffering?**
  - **If constructed correctly, can be summed to arrive at a continuum (e.g., of consequences).**

# As well...

- Most screen developers thought they were developing reflective screens.
- Most screens are really formative in nature though they test well as reflective. Why?
  - **Most highly correlated items are included in the final screen due to the design approach.**
  - **And many items that shouldn't be correlated highly with each other are. Why?**



# Selection of items in the measure based on correlation alone make a screen poor for prevalence studies.

- Three measures are correlated (loaded) highly with risk factor

- Item A  $r = 0.69$
- Item B  $r = 0.69$
- Item C  $r = 0.69$

ITEMS A & B ARE INCLUDED IN THE

**Must be cautious in relying too much on correlation of screen items with the latent measure and not placing enough consideration on the impact of the of the absolute values (e.g. number of people endorsing the item)**

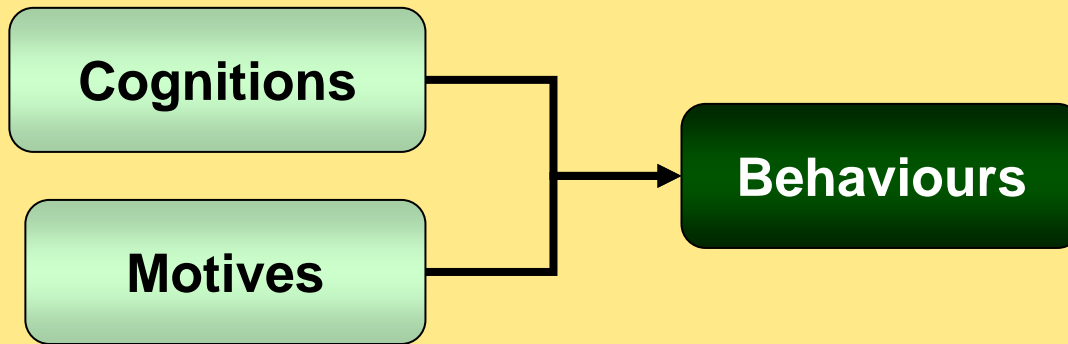
- Percent
- Item
- Item
- Item

- Percent
- item
- Item
- Item
- Item

RISK BY 66%.

# There is a Need for Second and Third Order Hierarchical Measures

## Second Order Construct



Previously, Gambling Screens have lumped all of these concepts into one screen.

## Third Order Construct



# Measuring Risk versus Problems

Gambling Continuum

**We need more accurate measures  
of both risk potential *as well as*  
problem gambling extent and  
impacts**

should not be treated as continuum.

# There are Differences in Risk Factors among various segments (Youth vs. Adults vs. Seniors)

## Youth

- Social/Peer pressure
- Involvement in other hobbies sports
- Transportation
- Beh
- Par
- So
- Ne
- fac
- Ha
- Likes it (affect)
- Beliefs and motives
- Depressed

## Adults

- Marital Status
- Children in Household
- Work Status
- Disabled
- Beliefs and motives

## Seniors

- Widowed
- Retired
- Socially isolated
- Home conditions
- Health
- Beliefs and motives

**Differences in risk factors must be reflected in the items used to identify risk among certain population or target groups.**

# Method Bias

- We make mistakes in what we measure and how we measure things, Method Bias deals with the “how”.
- Considerable research shows that method bias can account for 40% of the error in a single measurement.
- **Common method bias** can account for two thirds of the common variance. Statements that appear highly correlated (and therefore show up on the same construct) could be correlated only because they share common error variance.

# Improved Accuracy Through the Elimination of Method Bias

## Wording

- If wording is not applicable to all forms of gambling need to develop different screens or questions
  - *bet more to win back money have lost gambling on another day*
- Wording misinterpreted (must be sure that the question means the same thing to everyone)

## Scaling

- Ensure the scale fits with the statement and use different scaling when necessary

## Threshold for response

- Items range in sensitivity and so may need to incorporate different cut-offs for different items



# Risk Measurement

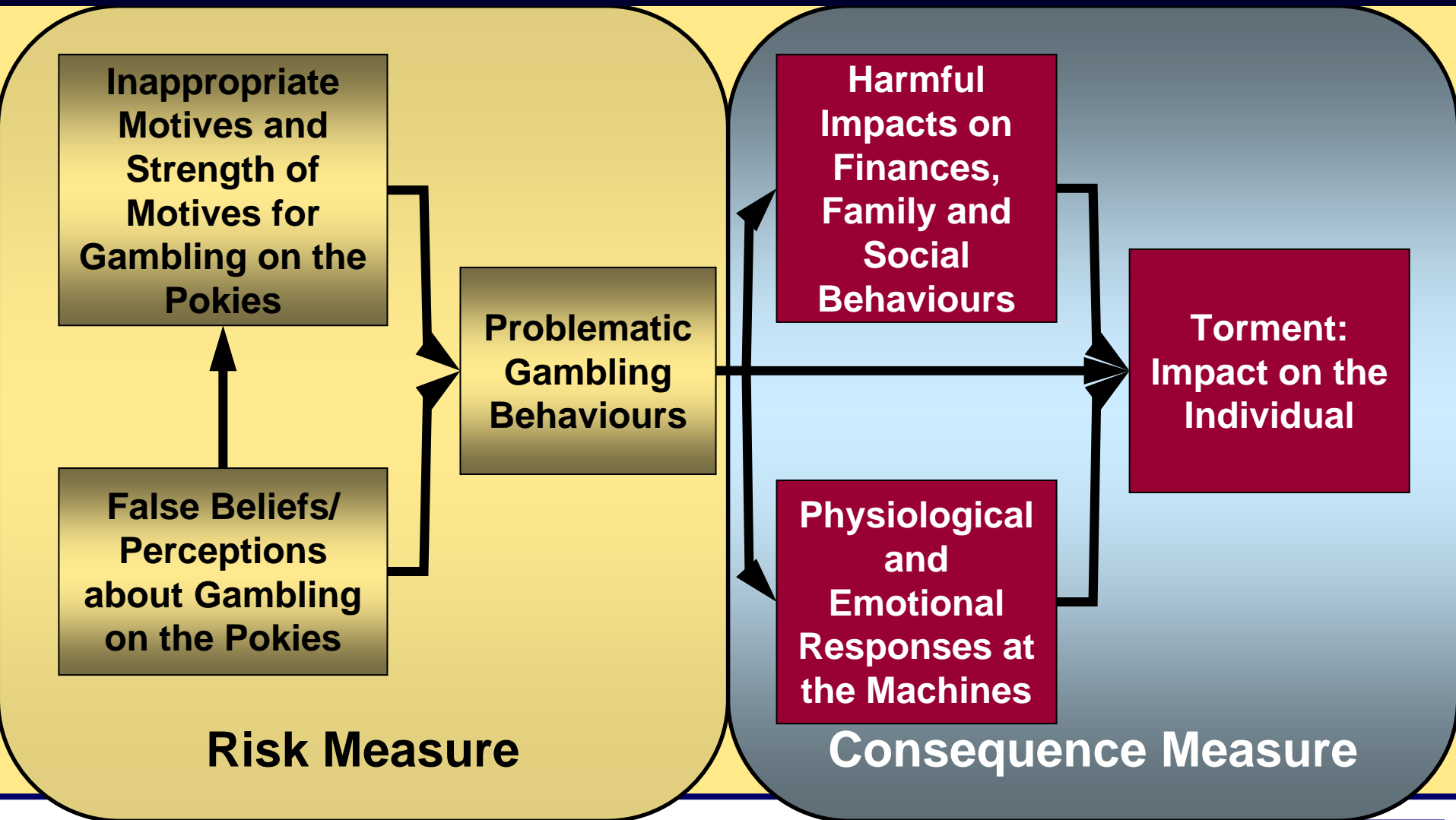
## Risk Measurement

Test of New Pre-Consequences,  
Post-Consequence Problem  
Gambling Screen  
*(How does it work)*

# Screen Design Considerations

- Focused on EGM gambling. There are several reasons for this focus:
  - **Accuracy increased**
  - **EGM gamblers characteristics and behaviours can be used**
  - **EGM Play accounts for large share of problem gambling.**

# Approach: Fourth Order Hierarchy of Effects Model



# Existing Self Administered Screens: Constructs used

Sub Screen	Screen 1	Screen 2	The Eight	CPGI	Total
Beliefs	0	4	0	0	4
Motives	2	2	2	0	6
Behaviours	3	2	1	2	8
P&E Reactions	0	0	0	0	0
Impacts	3	2	2	4.5	11.5
Torment	2	2	3	1.5	8.5
Self Declaration				1	1
Total Items in Screen	10	10	8	9	37

# 1998 Nova Scotia Video Lottery Study

- 711 regular gamblers
- 117 (16%) problem gamblers (Focal Triangulation Approach).
- Six formative (?) constructs formulated comprised of five to nine statements each.

# Sample Test Screen Statements

## Risk Components

### Erroneous Beliefs

- After a string or series of losses playing VL games I feel I am more likely to win
- I feel I can improve my chances of winning by using certain strategies or betting systems

### Inappropriate Motives

- I play video lottery games to forget my troubles or worries
- I sometimes play VL games with the hope of paying off my debts/bills

### Problematic Gambling Behaviours

- I often spend more time playing VL games than I intend to.
- After losing money playing VL games, I almost always have gone back later that day or on another day in order to win my money back.

## Consequences

### Physiological and Emotional Reactions Frequently Felt While Gambling

- Headaches
- Nausea/feeling sick to your stomach

### Torment

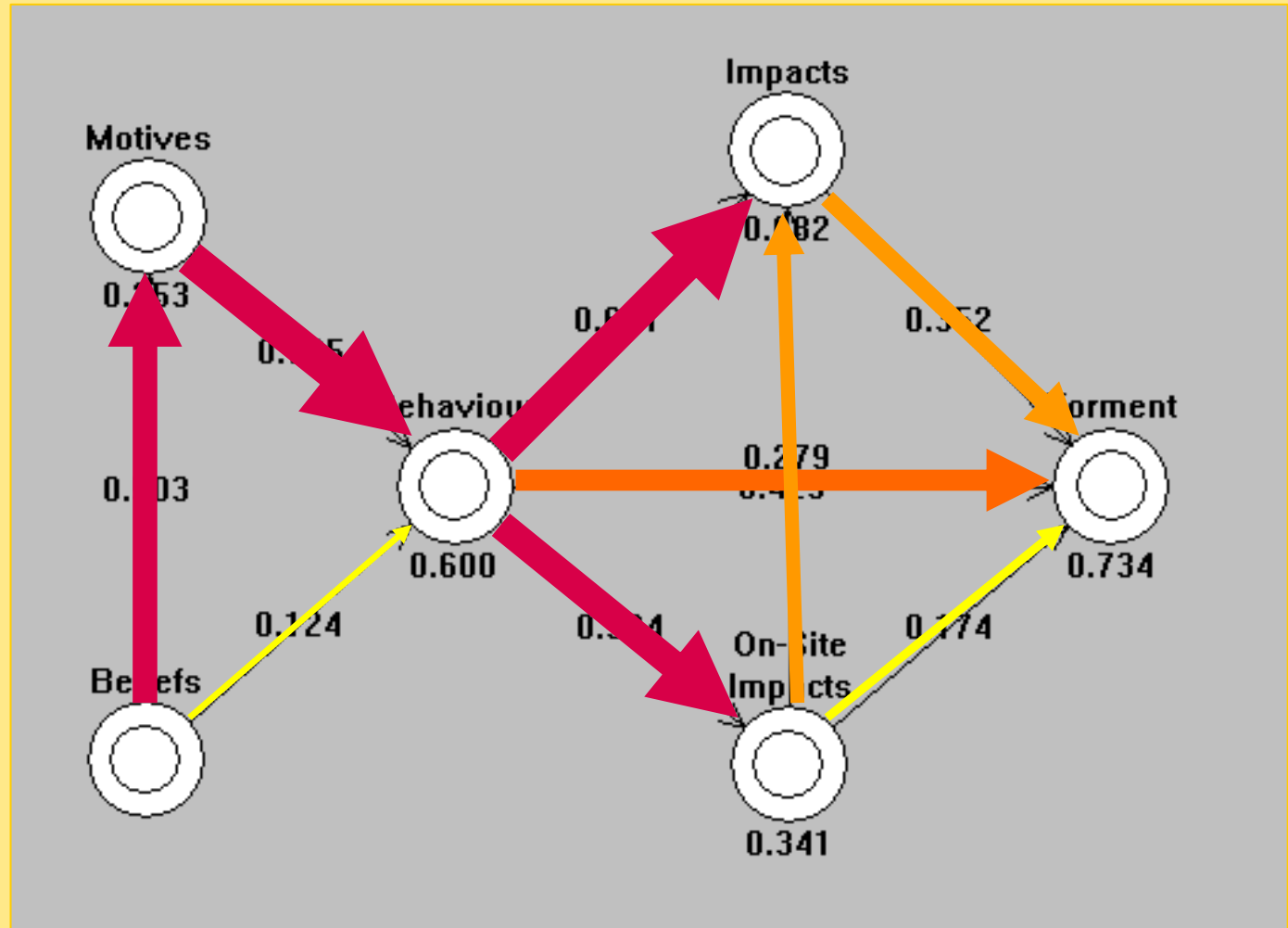
- I sometimes have trouble sleeping thinking about playing pokies.
- I sometimes feel guilty about the amount of money I spend on the machines.

### Harmful Impacts on Self and Others

- I have neglected family, friends or work in order to gamble on the pokies.
- I borrow money in order to continue gambling.

# Partial Least Squares Path Analysis (PLS-Graph): 98 NS VLT Study Data

Thickness  
Of the Arrow  
Proportional  
To Coefficient  
Size



# Key Results of Risk and Consequences Problem Gambling Screen Test Victoria Department of Justice Field Study

- Sample of 91 drawn from Victoria area gambling venues and through referral
- Sample pre-screened using PGSI (CPGI)
- One to two hour in-person depth interview. New Screen administered and evaluated.



# Revised Formative Constructs (34 items)

## **Erroneous Beliefs**

5 statements                      cut-off = 3

## **Inappropriate Motives**

8 statements                      cut-off = 2

## **Problematic Gambling Behaviours**

6 statements                      cut-off = 2

## **On-Site Harmful Impacts**

5 statements                      cut-off = 2

## **Torment**

5 statements                      cut-off = 2

## **Harmful Impacts**

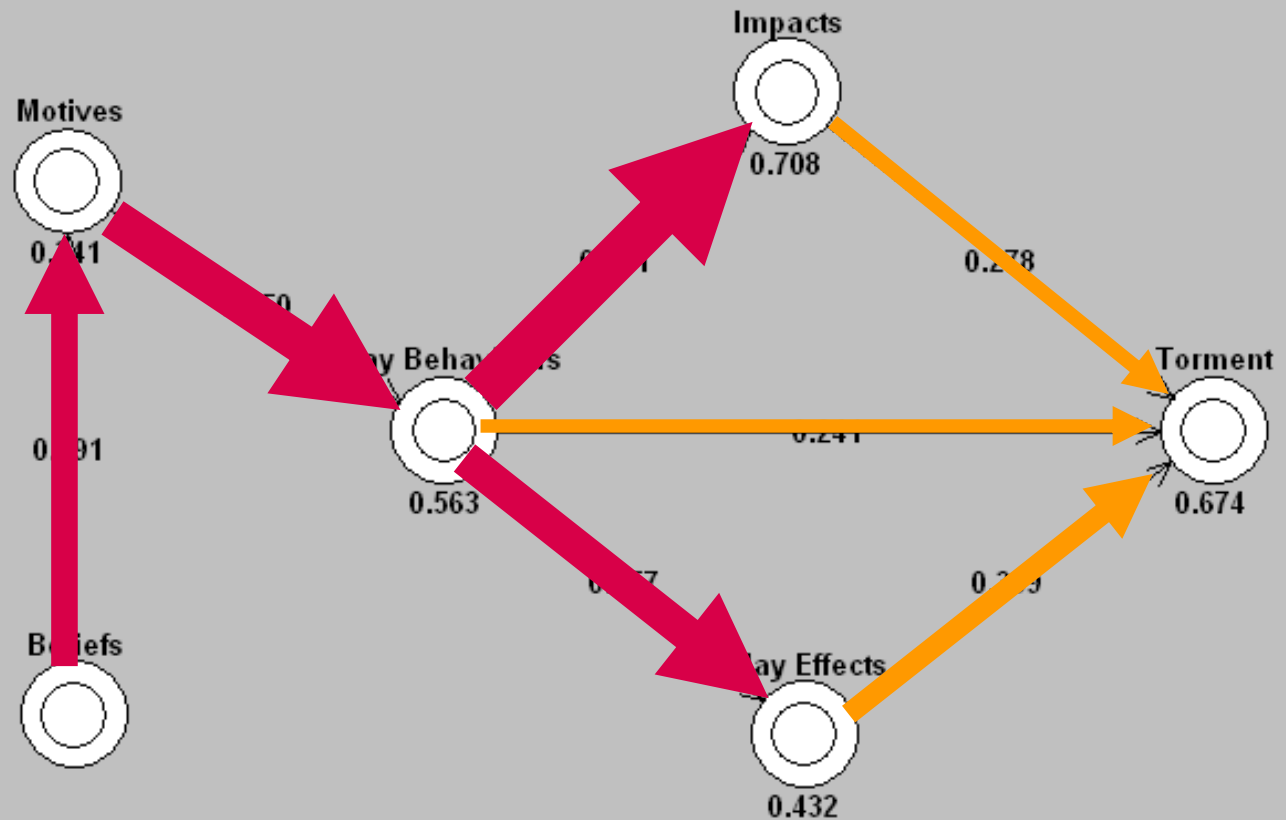
5 statements                      cut-off = 2

**If they are positive on more than two or three items for each construct then they are told this is an “indication” of potential problems with gambling.**

# Partial Least Squares Path Analysis (PLS-Graph): 06 Victoria Phase II Study

Thickness Of  
the Arrow  
Proportional  
To Coefficient  
Size

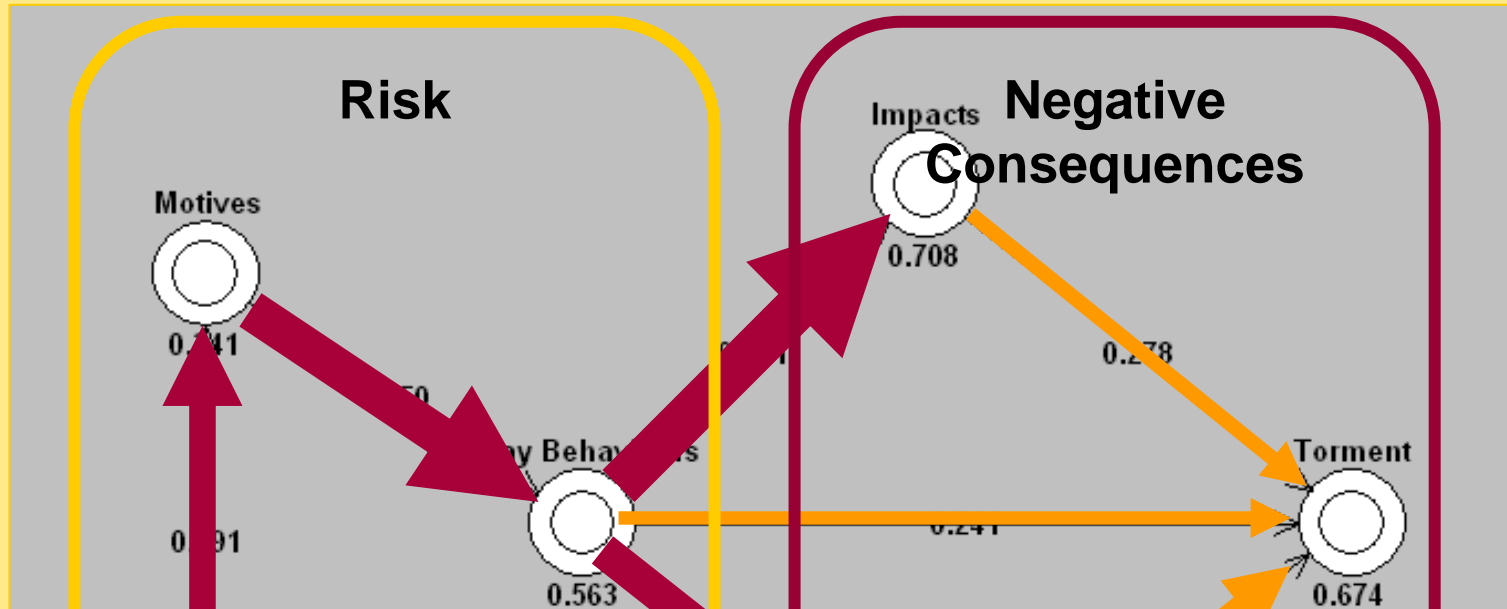
Uses Revised  
Formative  
Constructs



# Partial Least Squares Path Analysis (PLS-Graph): 06 Victoria SAPGS Phase II Study

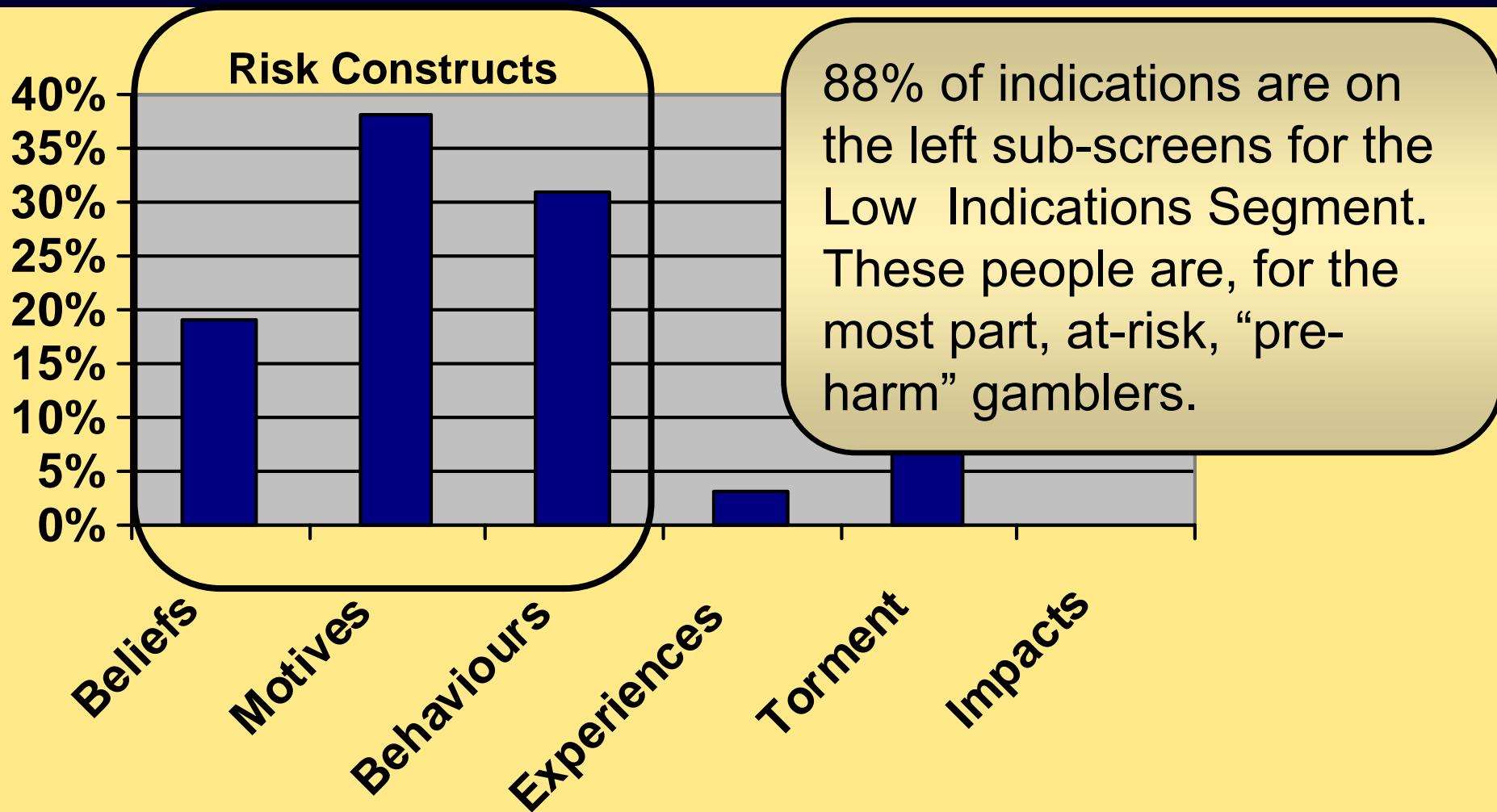
Thickness  
Of the Arrow  
Proportional  
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Size

Uses  
Revised  
Formative  
Constructs

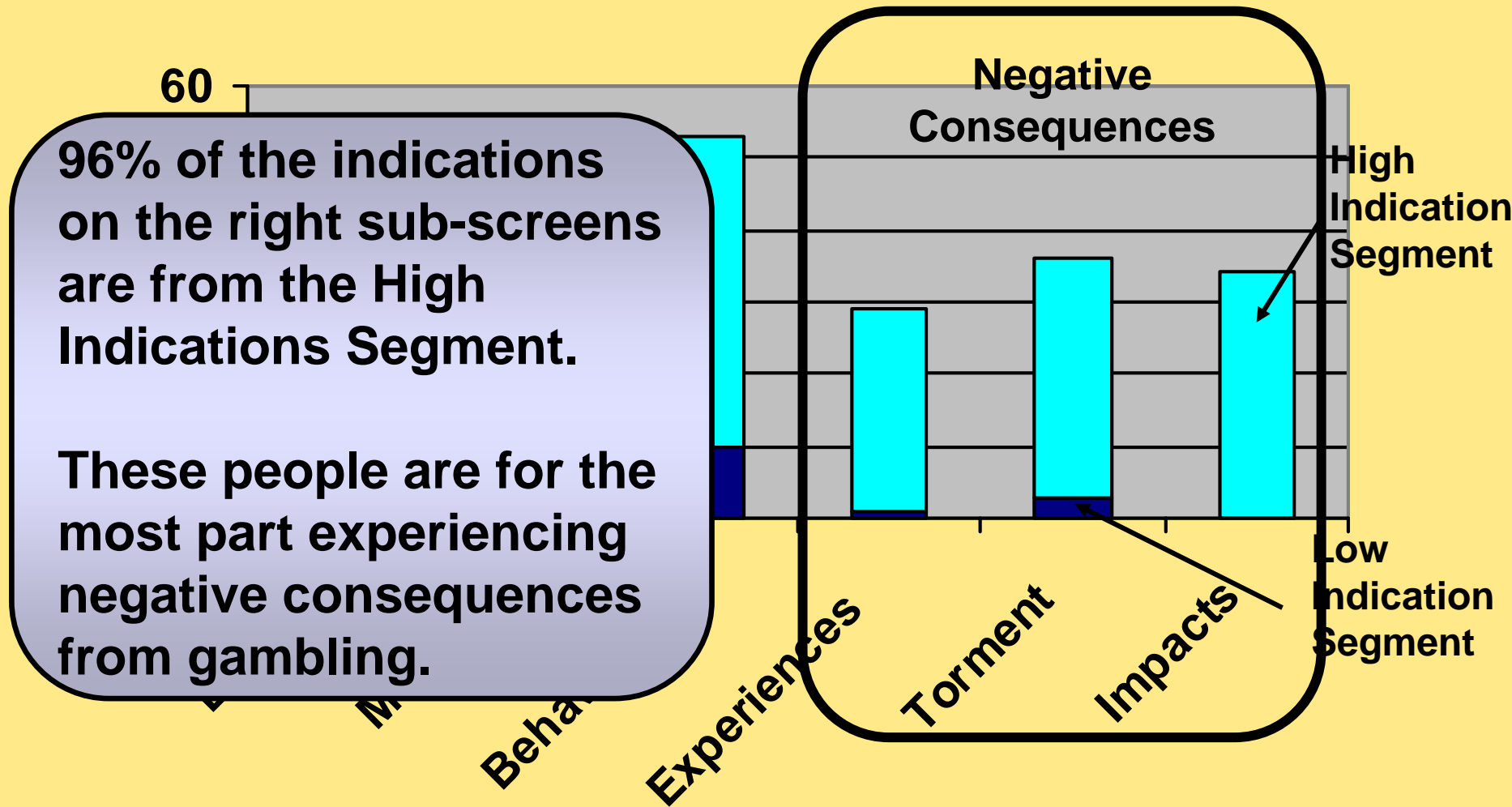


If this is true then there should be a group of gamblers who only trip on the left sub-screens and are thus at risk because of their beliefs, motives and behaviours, but they have not yet felt any negative consequences.

# Distribution of Indications by the At Risk Segment (1 – 2 indications)

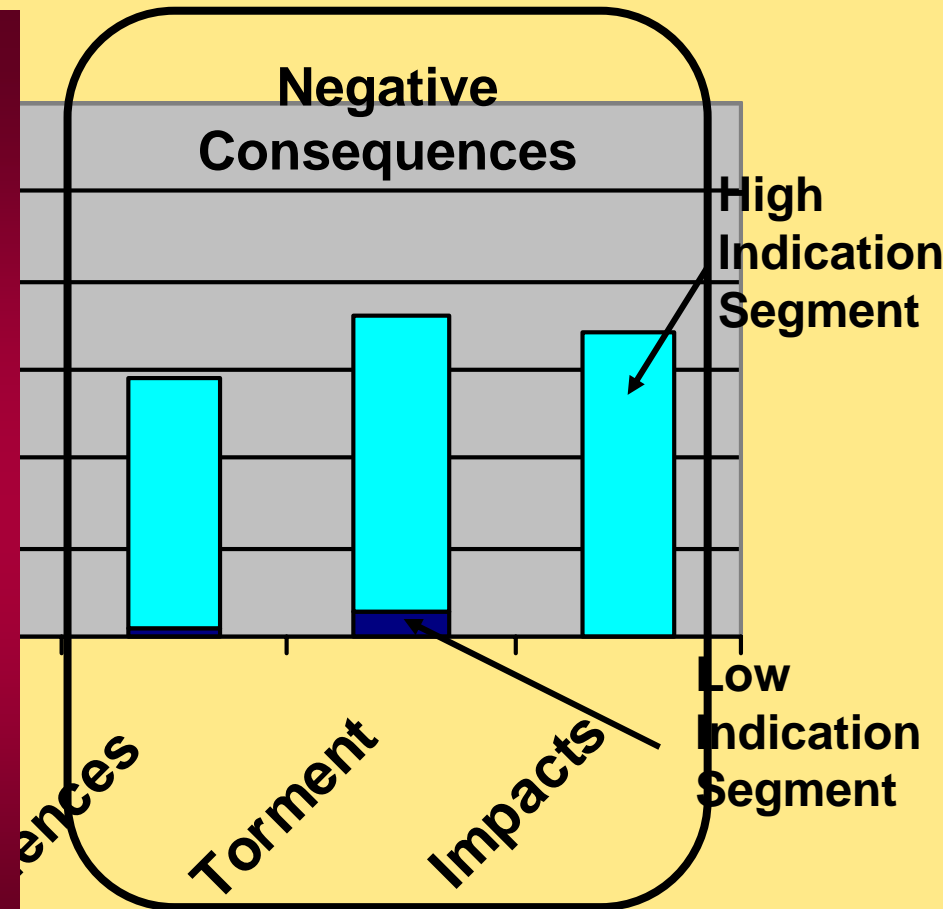


# Distribution of Indications by Low and High Indications Segments

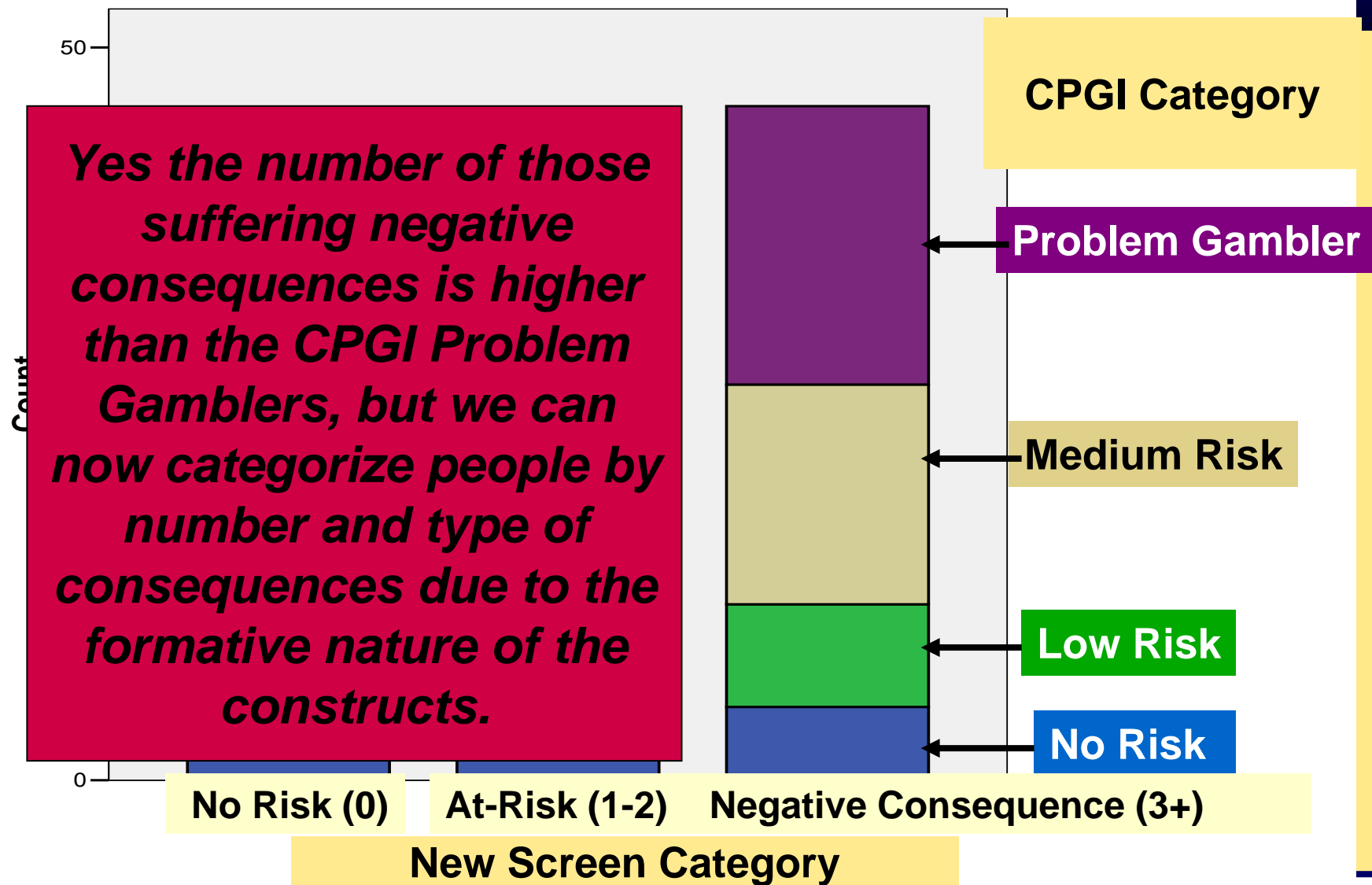


# Distribution of Indications by Low and High Indications Segments

- Can they have consequences without tripping on beliefs, motives or behaviours?
  - *Not likely - 100% of the High Indications Segment trip on one or more pre-consequence screens, 91% on two or more.*
- Do any of those designated as High Indications have no consequences?
  - *Yes, 4% have no consequences. 24% have one, 72% two or more.*



# Classification of PGSI Categories by New Screen Categories



# Conclusions: Hierarchical Model

- The Hierarchical Problem Gambling Model was strongly supported
  - *The constructs of erroneous beliefs, inappropriate motives and problematic gambling behaviors can be used to help identify At-Risk gamblers*
- Erroneous beliefs only appear to be a problem if the gambler has inappropriate motives for gambling.
- The research **does not absolutely prove** that At-Risk gamblers become problem gamblers. Gamblers would have to be monitored over time to prove this.
  - *As far as we know no other screen has been tested in this way either.*



# Next Steps?

- Develop separate measures for risk and problem gambling based on appropriate theory
- Develop screens based on formative and reflective constructs where appropriate
- Use appropriate criteria for inclusion of items
- Develop criteria for setting the level of response that truly indicate risk or problems
- Design screens that minimize method bias
- Design screens that work for various forms of gambling
- Design screens that are of value to all stakeholders, including health, regulators, gambling providers and the gamblers themselves.

***(OPGRC Project starting soon.)***

# QUESTIONS?

Contact Information: [focal@focalresearch.com](mailto:focal@focalresearch.com)

# Example: Business Travel Screen – (Formative)

During the past year ....

<b>Your family relations has suffered due to your business travel.</b>	<b>Yes</b>	<b>No</b>
<b>Relations with friends and family have been strained at times due to you being away for business.</b>	<b>Yes</b>	<b>No</b>
<b>Those close to you resent your being away for business purposes.</b>	<b>Yes</b>	<b>No</b>
<b>Traveling for business away from home has caused you anxiety with loved ones</b>	<b>Yes</b>	<b>No</b>

# Example: Business Travel Screen – (Formative)

During the past year ....

<b>Your family tends to miss you while you are traveling for business purposes</b>	<b>Yes</b>	<b>No</b>
<b>You experience sleep disturbances when you are traveling on business</b>	<b>Yes</b>	<b>No</b>
<b>You have missed significant family events due to business travel</b>	<b>Yes</b>	<b>No</b>
<b>Traveling for business away from home has caused you anxiety</b>	<b>Yes</b>	<b>No</b>

# Example: Business Travel Screen – (Reflective)

During the past year ....

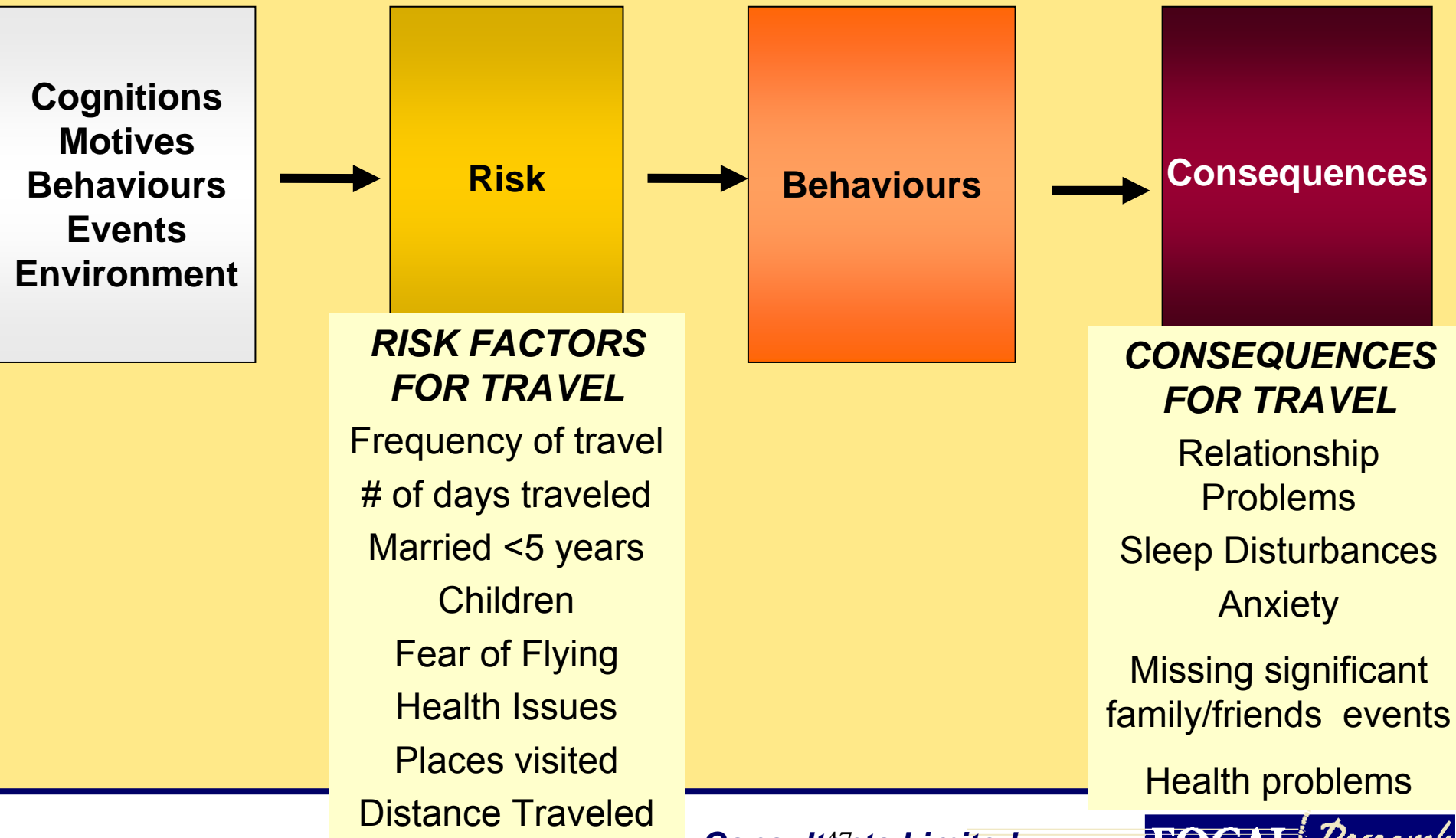
<b>You sometimes felt guilty about how much time you spend traveling for business</b>	<b>Yes</b>	<b>No</b>
<b>Family and/or Friends have complained about how often you are away</b>	<b>Yes</b>	<b>No</b>
<b>You have missed significant family events due to business travel</b>	<b>Yes</b>	<b>No</b>
<b>Traveling for work has put a strain on your relationship problems with a spouse or partner</b>	<b>Yes</b>	<b>No</b>

# Example: Business Travel Screen

- A. You sometimes felt guilty about how much time you spend traveling for business**
- B. Family and/or Friends have complained about how often you are away**
- C. You have missed significant family/friends events due to business travel**

**If we used AB to identify people in audience at this session the number of people identified was 300% higher than if we used items BC to identify business travel risk (22 versus 7).**

# Example: Risk versus Consequences Models for Business Travel



# Example: Risk versus Consequences Models for

Cognitions  
Motives  
Behaviours  
Events  
Environment

*From an employer perspective may be very helpful to know “what” key factors are contributing to risk in order to adopt employee policy that “prevents” or minimizes the occurrence of negative consequences associated with business travel for their staff.*

Consequences

## **RISK FACTORS FOR TRAVEL**

Frequency of travel  
# of days traveled  
Married <5 years  
Children  
Fear of Flying  
Health Issues  
Places visited  
Distance Traveled

## **CONSEQUENCES FOR TRAVEL**

Relationship Problems  
Sleep Disturbances  
Anxiety  
Missing significant family/friends events  
Health problems



# Comments From Gamblers

## Appropriateness and Connection with Gamblers

*“It has got all of the questions that gamblers should ask themselves. It makes me stop and think about what I am doing. It is very true in it’s statements.” (At Risk by both screens)*

## Perceived Validity of Screens

*“It covers a lot because it really brings out a feeling and understanding of how I feel when I gamble” (At Risk by SAPGS)*

*“It pretty much covers all aspects. It singles out every potential aspect and problem that could arise from gambling for the wrong reasons. It was very easy to understand” (At Risk by SAPGS)*

## Perceived as Truth Revealing

*“It was very true what the brochure says in the way it shows my behaviour” (At Risk by both screens)*

*“It is a direct through the interpretations of behaviours. Everything on it is valid and true.” (At Risk by both screens)*

## Non- Threatening

*“I know of a lot of people who have spent a lot of money on the pokies, and it can only be a good thing for them if they realised what they were actually doing. People want to help themselves and make the initial step without being told that they have a problem” (At Risk by CPGI)*

## Ease and Fun Filling Out

*“I liked the fact that it was straight to the point. The questions were very relative to me. I liked the way it was set out. It made me want to complete all of the questions. It kept me interested.” (At Risk by both screens)*

# Value of Approach

*“I think it’s a good thing to let people fill this out themselves and to actually realise they have a problem, instead of little cards that just have a number to call.”*

*“The overall summary box at the back of the brochure was very truthful of my situation and it brought out things I wouldn't have thought I did until now.”*

*“I think people would like the chance of self assessing their own behaviour, instead of having someone tell them why they play. They have control.”*

*“I was not surprised with my answers and the explanation, they were correct that I might be leading to a problem. It is good wording that I will remember and think about. It was straight to the point. I couldn't avoid the truth.”*

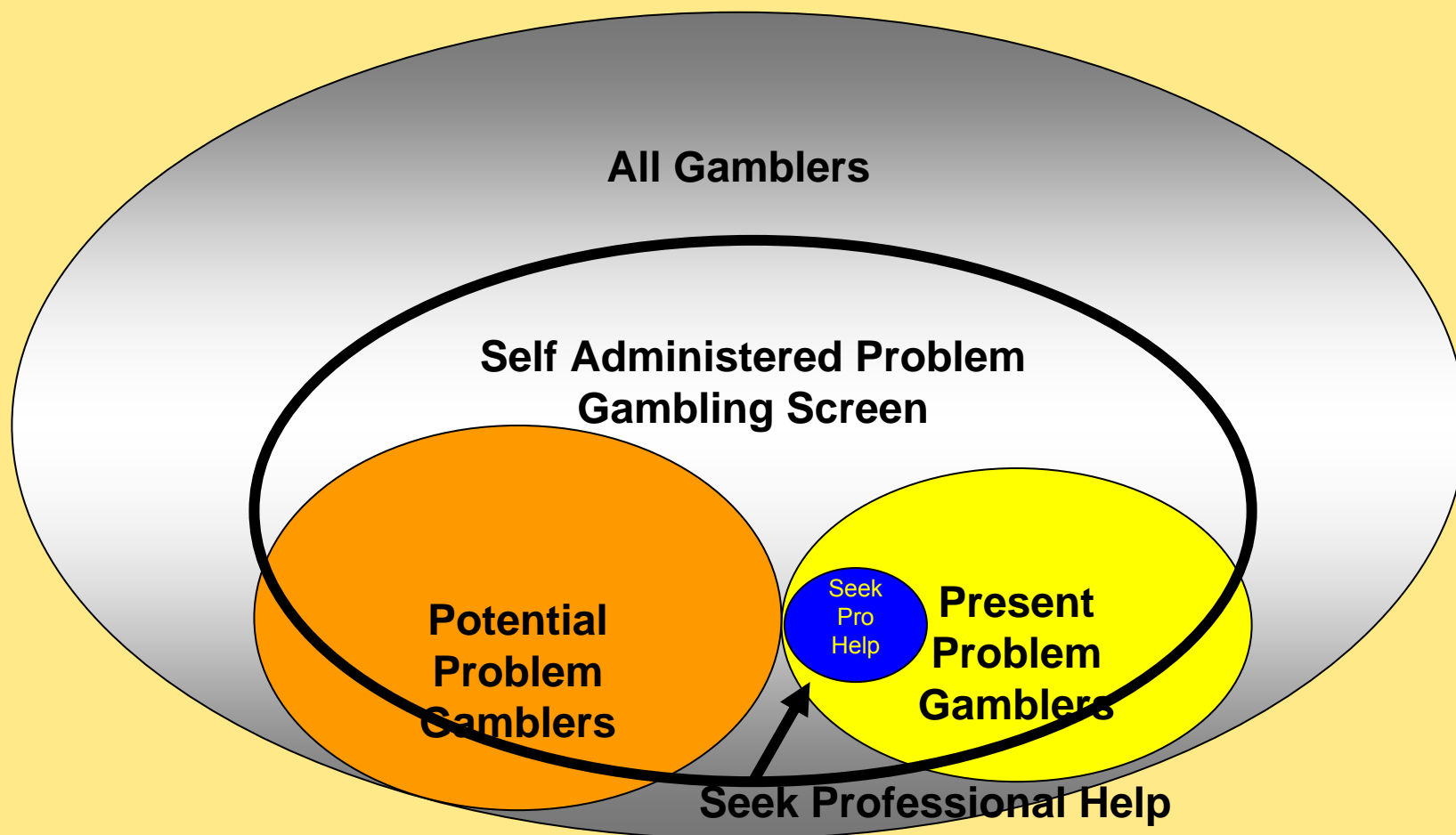
**People were not always convinced but feedback suggested it made them re-think or consider their behaviours.**

*“I think the information was a bit over-dramatized with what it implied about my behaviours, but maybe I just hadn't realised that I might be leading to problem“*

*“I feel the explanations were nearly accurate for my answer. It said that I might have a problem but I don't think that is correct at all. Not yet“*

*“With the info on the back, it says I have a problem don't really agree with it. I might have to look at how I am gambling and maybe change it“*

# The Potential Reach of the SAPGS



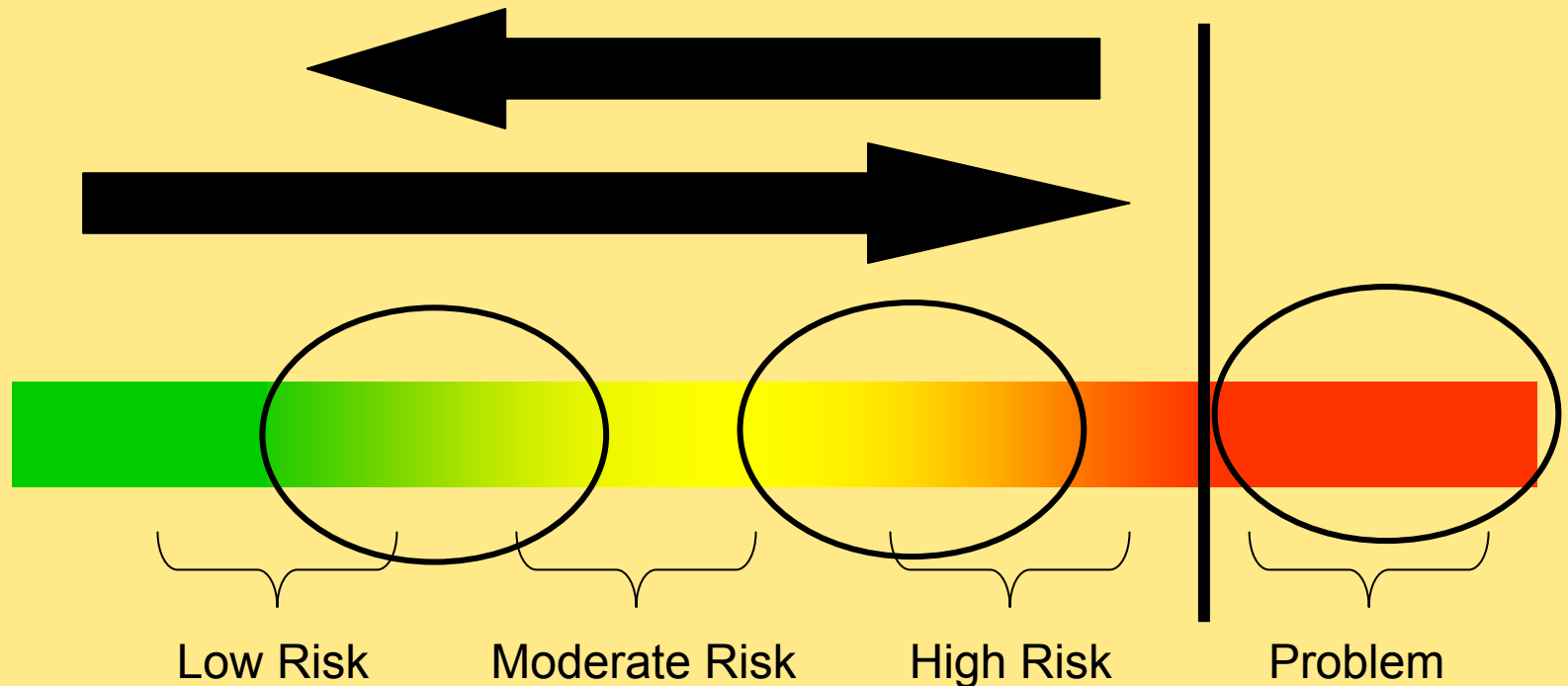
Potential Reach for Testing gamblers is 30 times greater than at present

# Advantages of Formative and Hybrid Approaches to Risk Measurement

- Measures more than latent variables
  - *can be behaviors, motives, and other things that are not single entities and therefore we need more exhaustive inclusive list of items that could be important in profiling person*
- Accommodates interaction of different risk factors that will vary among people depending upon characteristics and situation
- Offers practical solutions based on inputs
- Has potential for including pre-harm items
- Can incorporate new developments in the model without having to re-design (*add in new risk factors as they are discovered or arise*)

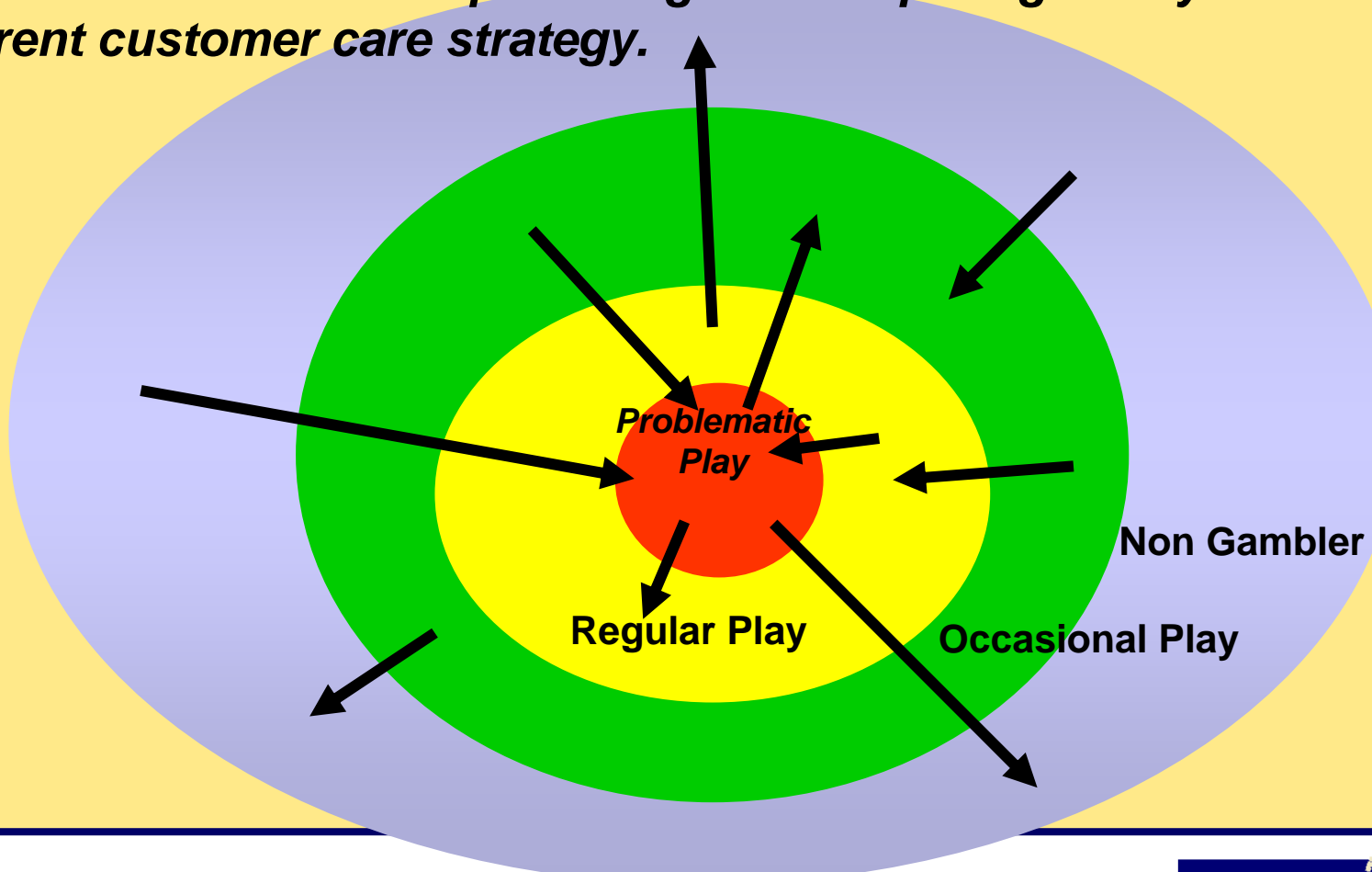
# Gambling Risk Continuum

**Example:** *Players progress along a continuum of risk with different objectives and strategies linked to various target groups. Strategies are based on goal of preventing progression of risk reducing high risk and identifying and referring problem gamblers for help.*



# Dynamics of Reality (Player Tracking Data):

*Individuals move in and out of risk depending upon many different factors including what is going on in their lives and their interaction with the product/games-requiring a very different customer care strategy.*





# Result: Responses are based on Implicit Theories

- If wording, scaling, statement construction are wrong, respondents develop a theory as to what is the appropriate response and use that for selecting answer.
  - *own heuristics or implicit theories*
- This leads to high correlation among items, apparent high reliability
- The greater the common method bias the greater the internal reliability measure (alpha).

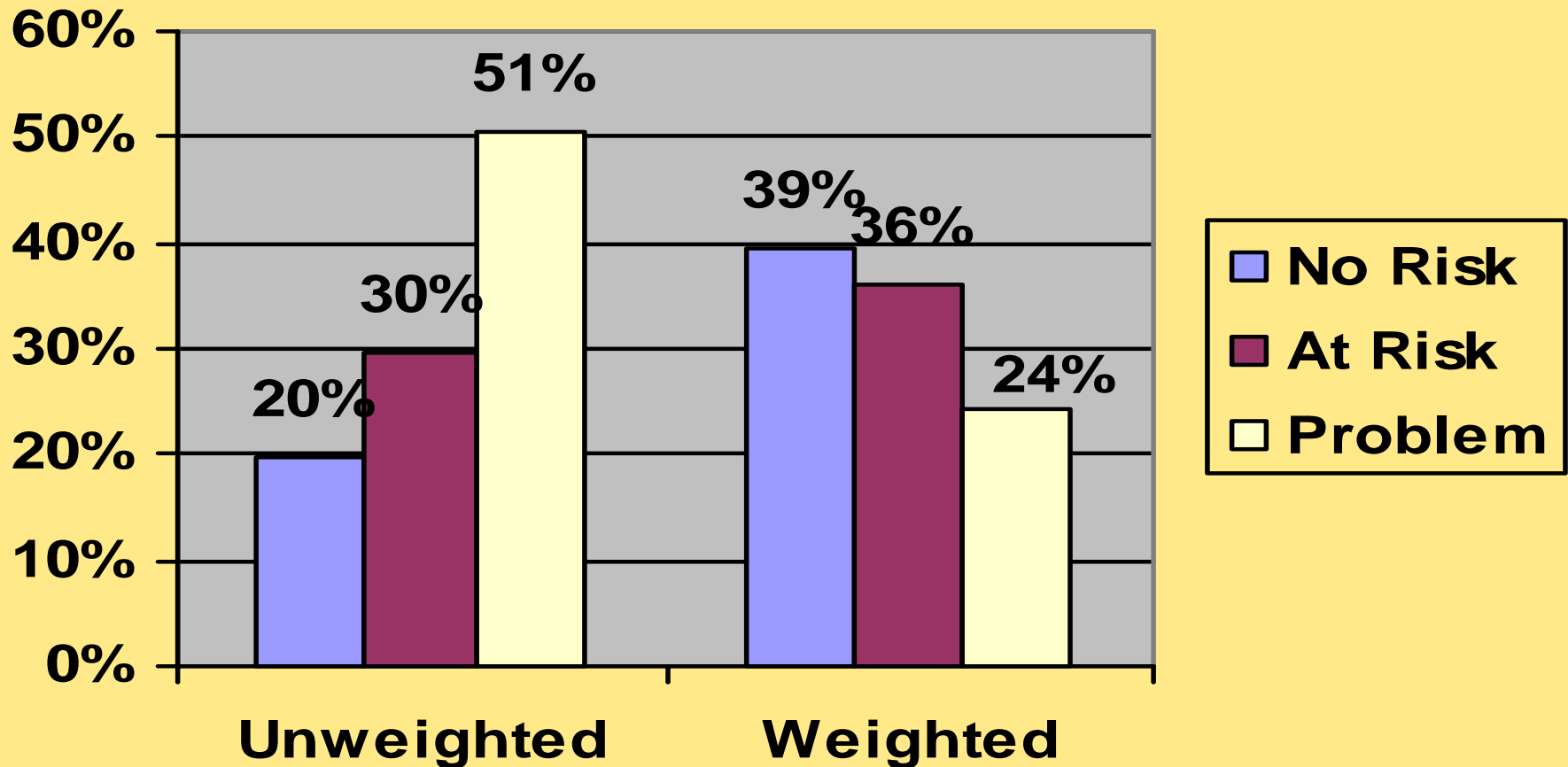
# Potential Value of Multi-Screen Approach

## Classification Ability of the Approach

Number of positive screens	Non Problem Gambler	Problem Gambler
0 - 1 positive screens	95.8%	27.2%
2 - 6 positive screens	4.2%	72.8%
% of 2+ positive screens	22.4%	77.6%

The power of the combined screens to identify Problem Gamblers is superior to any single screen.

# Classification Adjusted for Frequency Bias



# Example of Gambling Behavioral items for Formative Constructs

- Behaviours
  - Leaves only at closing time
  - Has longer gambling sessions
  - Chases losses
  - Intensity of gambling
  - Plays certain types of games
  - Enjoys different forms of gambling
  - Gambles alone or with others
  - Gambles at certain times of the day
  - Frequency of gambling
  - Behavior with wins/losses

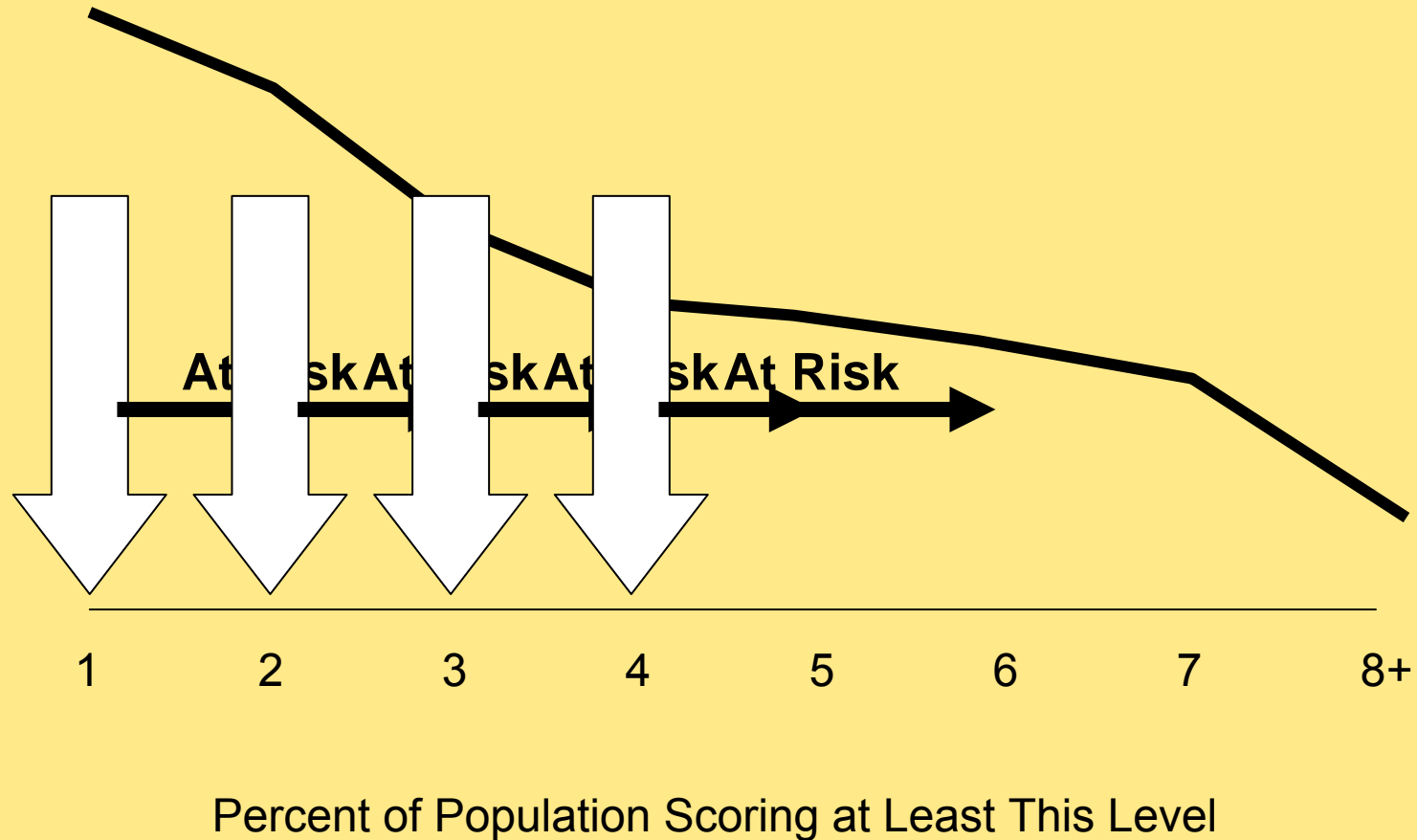
**May or may not be correlated with each other.**

# Scaling Values

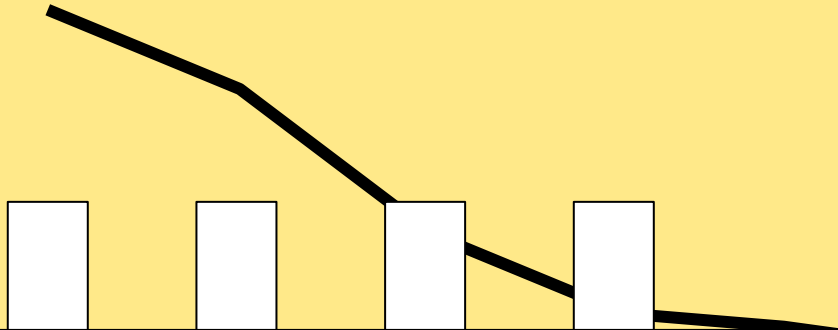
1	2	3	4	5	6	7	8	9	10
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- Please assign each of the following categories a numerical value using a scale of 1 to 10
  - 1 Never
  - 10 Always
  - 2 - 6 Sometimes
  - 2 - 4 A little
  - 5 - 9 Frequently
  - 2 - 4 Rarely
  - 8 - 9 Almost Always

# Choice of Cut-off is Critical to Estimating Risk and Prevalence



# Choice of Cut-off is Critical to Estimating Prevalence



We need a good reason for a cutoff  
We need theoretical and  
empirical evidence