NeuRA
Discover. Conquer. Cure.
INJURY PREVENTION

UNSW SYDNEY

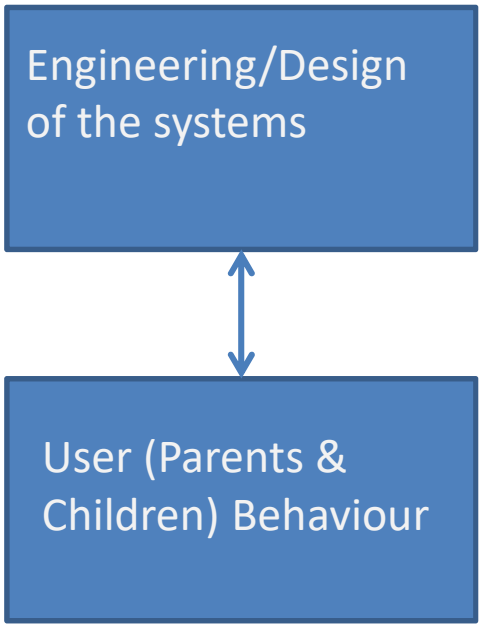
User-driven design of child restraint information

Julie Brown

The George Institute for Global Health

Background

Optimal crash protection



Background

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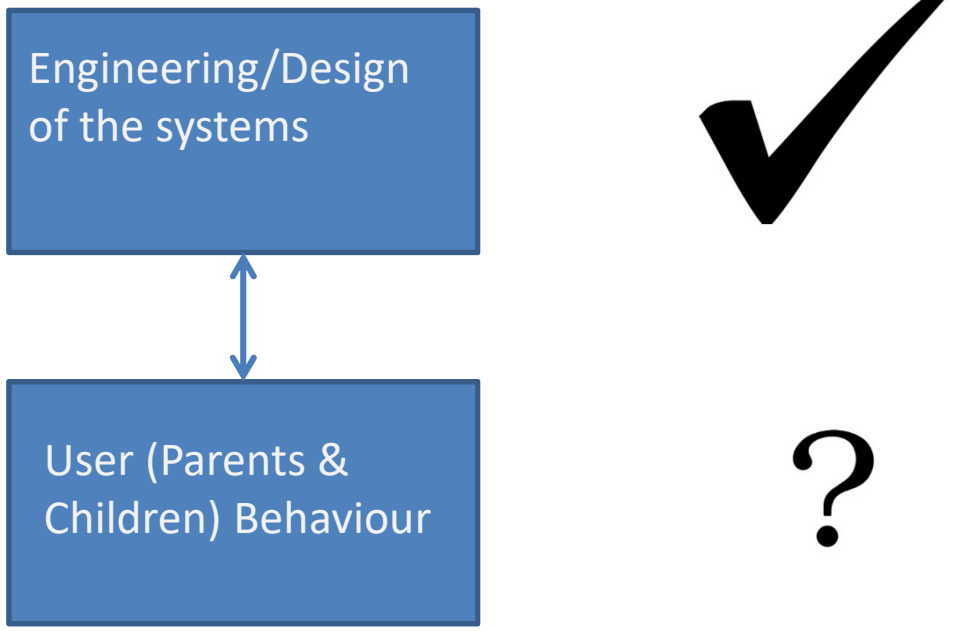


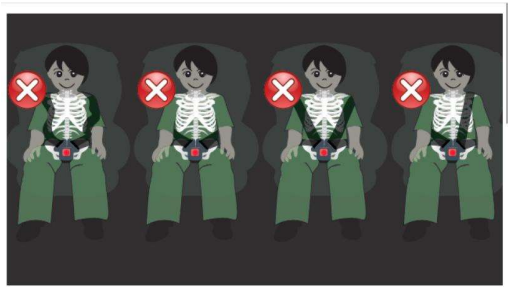
Background

Incorrect use of child restraints

- is widespread and long standing

- increases risk of serious injury by up to 3 times

Errors in installation & Use



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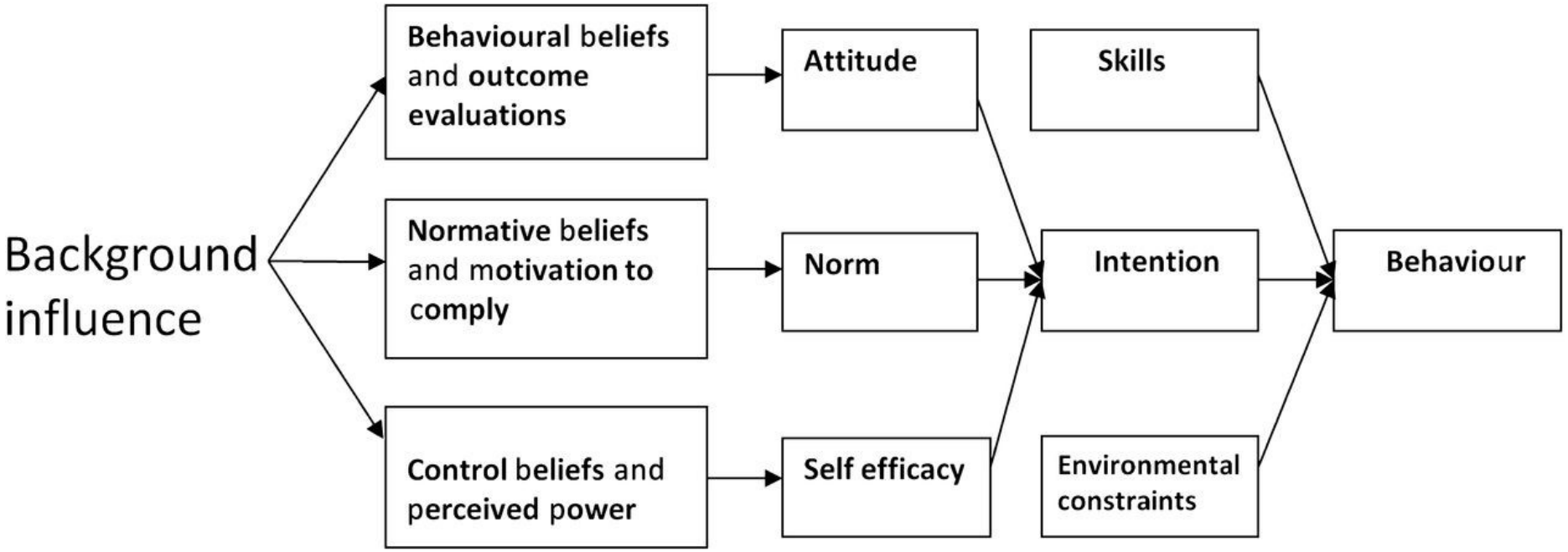
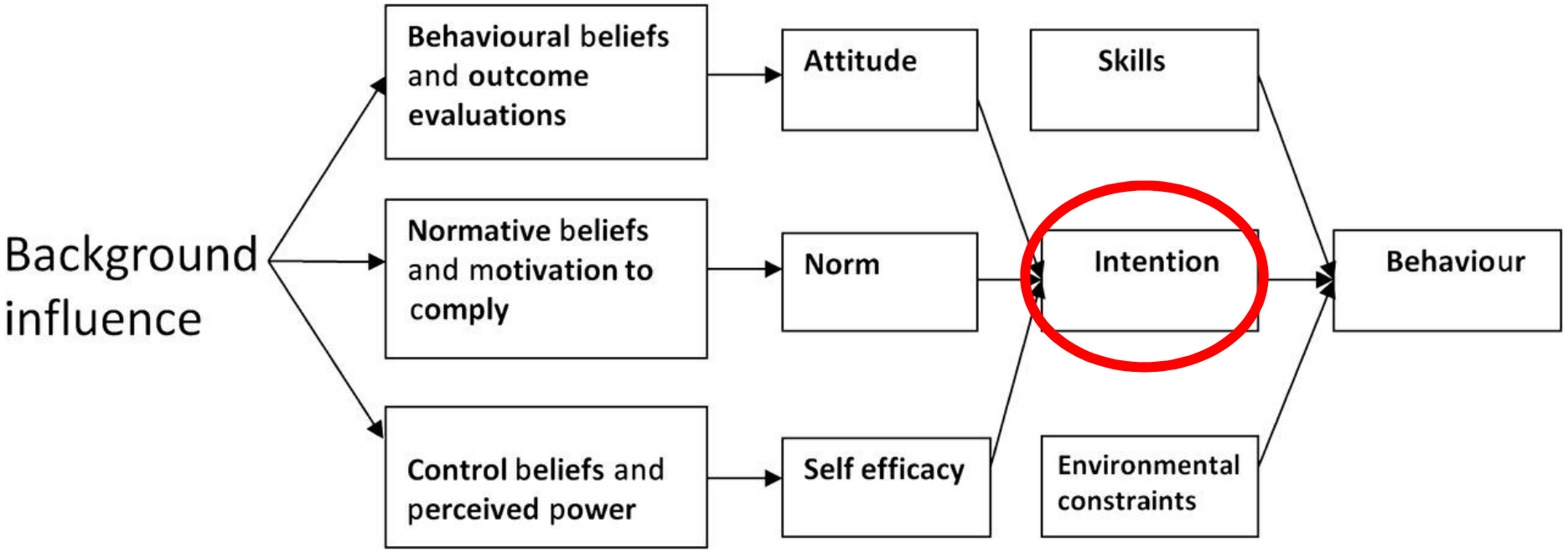


Integrated model of behaviour (Fishbein)

Background



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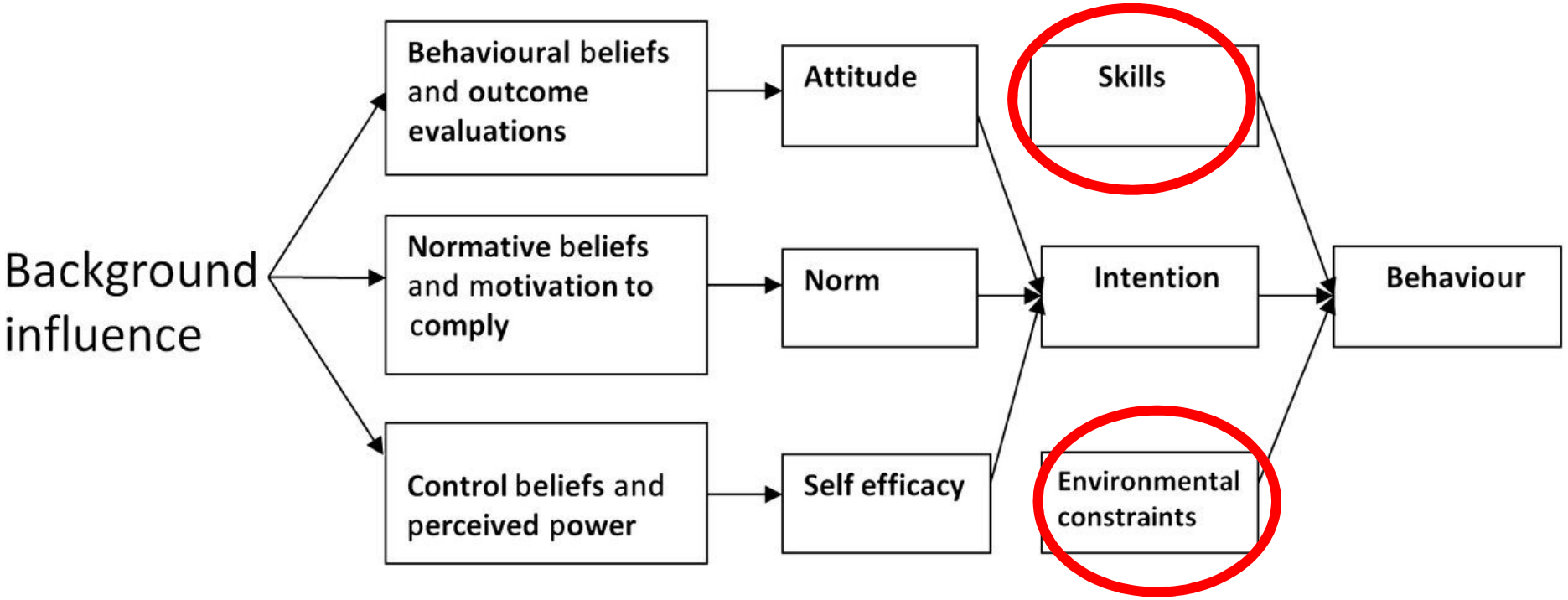


Integrated model of behaviour (Fishbein)

Background change for correct use

Skills

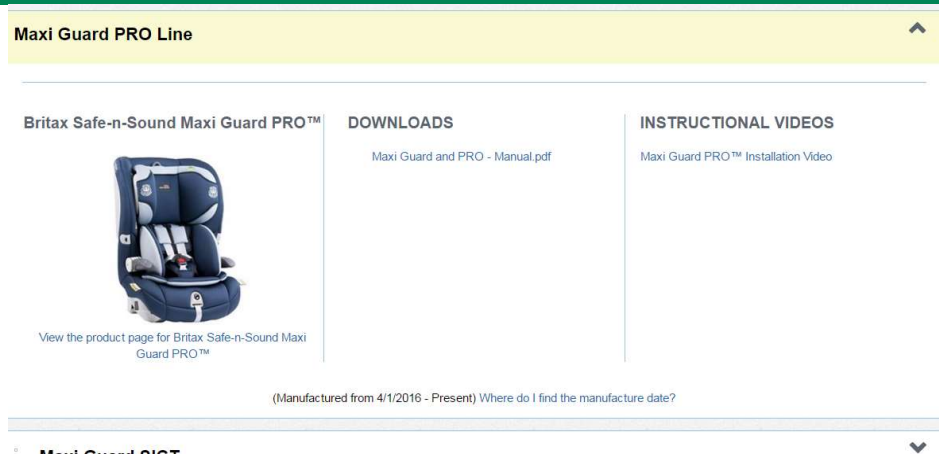
- Need to know how to use the restraint correctly

Environment

- Physical barriers to achieving correct use

Informative materials

Labels on the restraint



Instructional videos

Instruction booklets

Informative materials

Instructions provided with child restraint

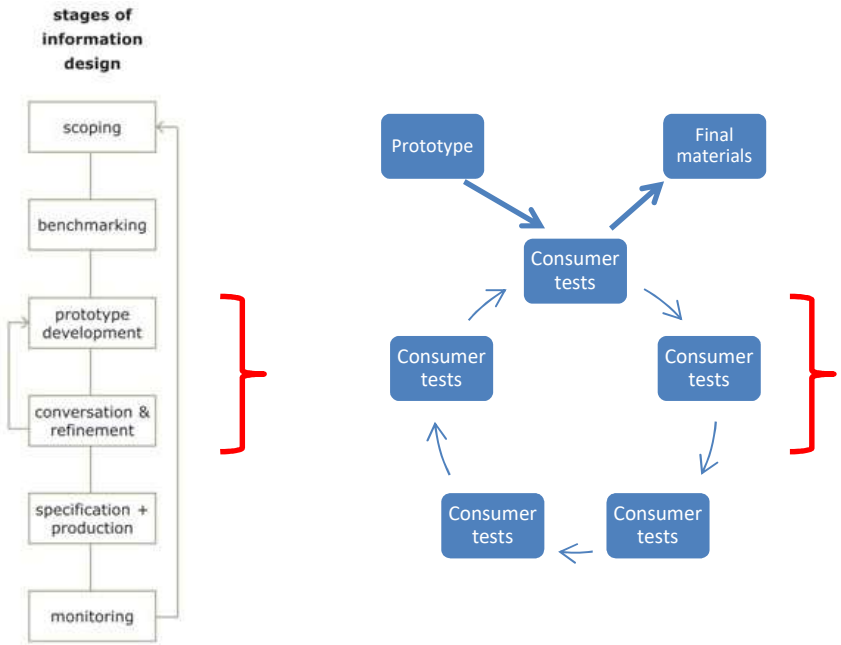
- regulated by product standards

- historically not involved users in development

Health communication

Gold standard for health communication is to involve consumers in the development of informative materials

User-driven design of informative materials

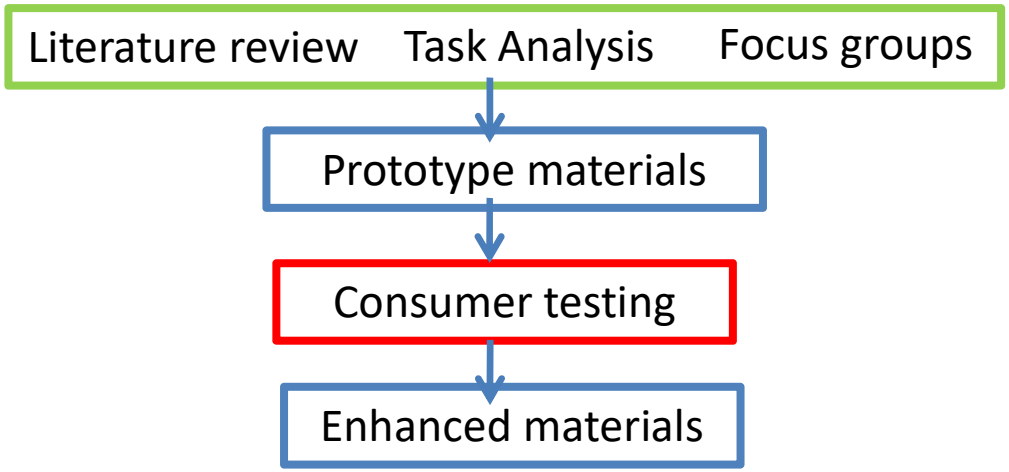


Users of this method in the context of written medicine information have reported that 90% of the weaknesses in the material can be identified within 10 cycles of testing.

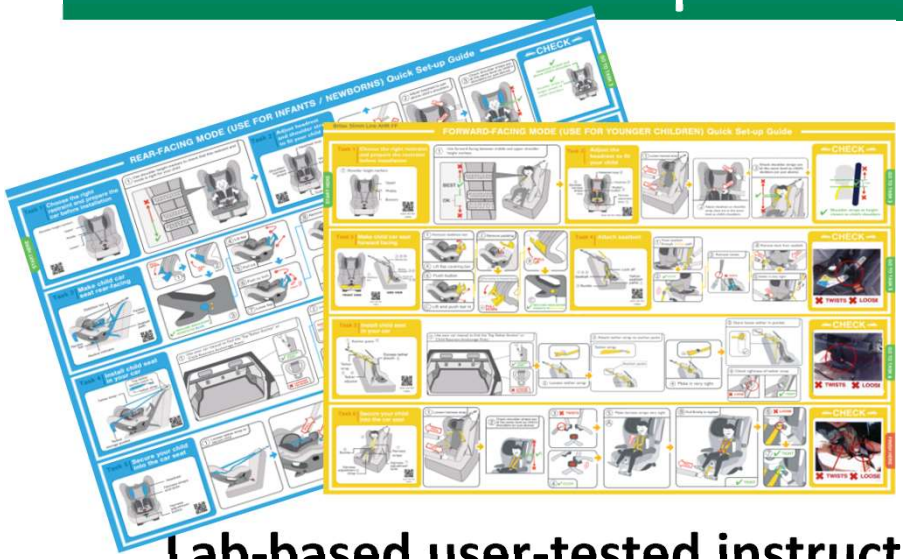
Jay E, Aslani P, Raynor DK. User testing of consumer medicine information in Australia. Health Education Journal. 2010

Sless D. Usable medicines information. Communication Research Institute of Australia p-Paper, Hawker. 2001

User-driven design of informative materials

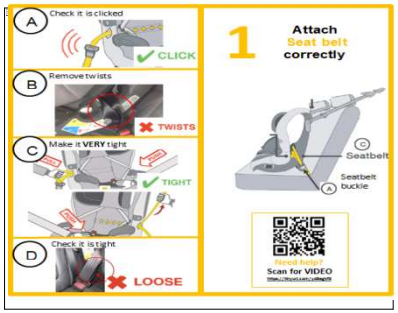


New user-developed instructions



http://q-r.to/baoUit

Lab-based user-tested instructions, QR coded video and swing tags

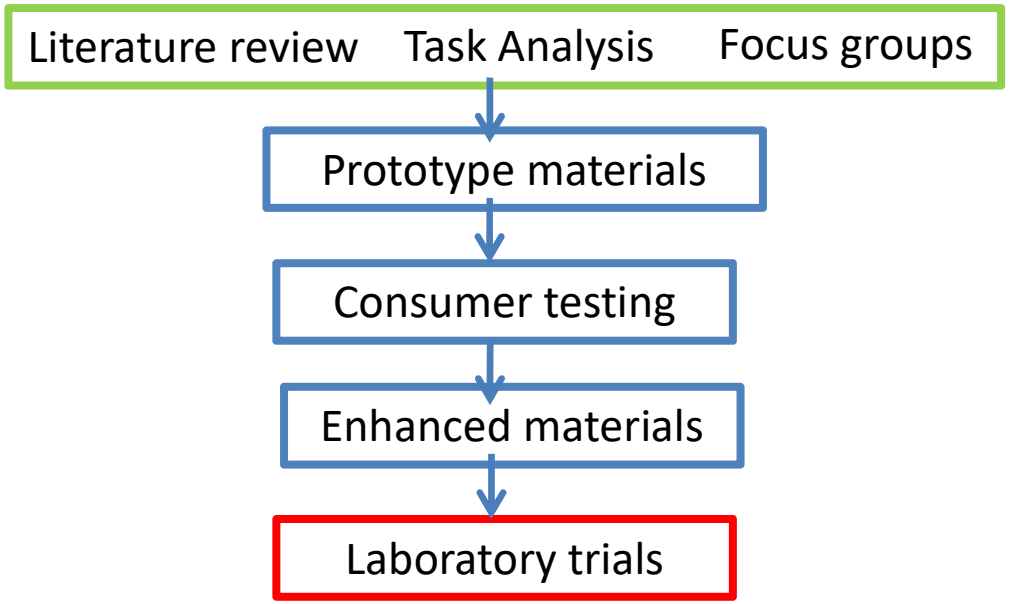


New user-developed instructions

Britax MaxiGuard Pro
forward facing car seat up to 8 years

Britax Compaq convertible rearward-forward facing car seat up to 4 years

User-driven design of informative materials



Method - Lab trial

Recruitment through a mix of strategies (N=44)

RANDOMISATION

INTERVENTION GROUP (User-developed instructions, N=22)

CONTROL GROUP (Standard manufacturer's instructions N=22)

Check for errors in restraint installation & dummy-child secured within CRS (BLINDED)

Verbal comprehension test (NOT BLINDED)

New user-developed instructions

Britax MaxiGuard Pro
forward facing car seat up to 8 years

Britax Compaq convertible rearward-forward facing car seat up to 4 years

Method - Lab trial

TASK

Using the instructions provided:

- Install CRS in forward facing mode (from rear facing mode) following the instructions available to them
- Secure the mannequin in the CRS
    - No time limit
    - Do the best job you can
    - Researcher will not answer questions

Data collected

CORRECT USE SCORESHEET

20 items – including

- harness fit,
- belt routing and adjustment,
- top tether tension & anchor point,
- slack and twists in straps

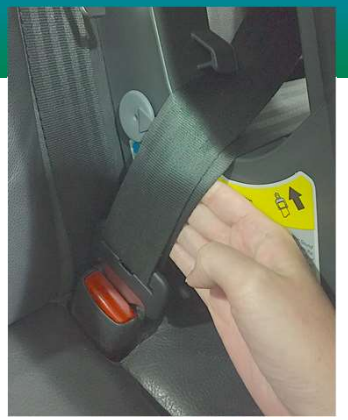
Assessment of **any errors** & **serious errors** - based on crash lab tests done in previous studies

COMPREHENSION

10 items relevant to correct installation - including:

- what to check and how,
- correct belt paths,
- shoulder height guides

- Locating information in materials (/10)
- Use that information to answer the question (/10)



Outcome measures

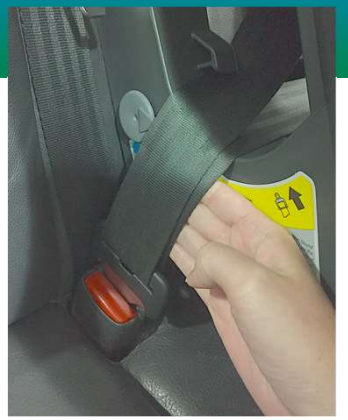
Primary Outcome

Overall serious misuse Yes/No

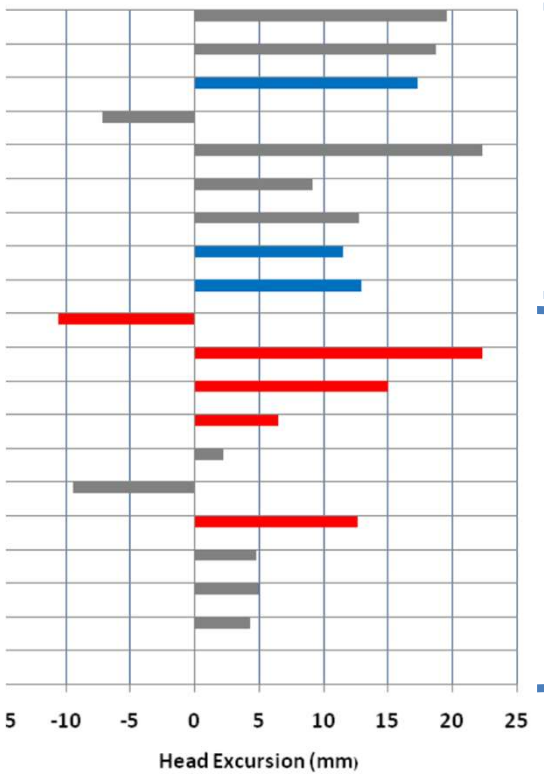
serious misuse = More than one minor error/ one or more serious errors
-serious error defined from previous crash test studies
-multiple minor errors equate to similar performance as a serious errors.

Error	Description	Effect
1		Serious/
2		Minor
3		
4		
20		

Example Error Scoring Checklist



Serious error classification



Multiple errors,
Multiple minor errors in blue

Single errors,
minor in grey,
serious in red

Tai, Bilston & Brown ESV, 2011

Outcome measures

Primary Outcome

Overall serious misuse Yes/No

serious misuse = More than one minor error/ one or more serious errors
-serious error defined from previous crash test studies
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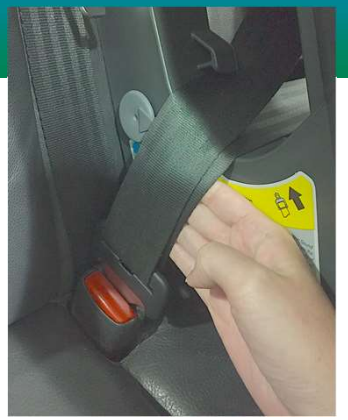
Secondary Outcomes

%Overall comprehension

- Locating information in materials
- Use that information to answer the question

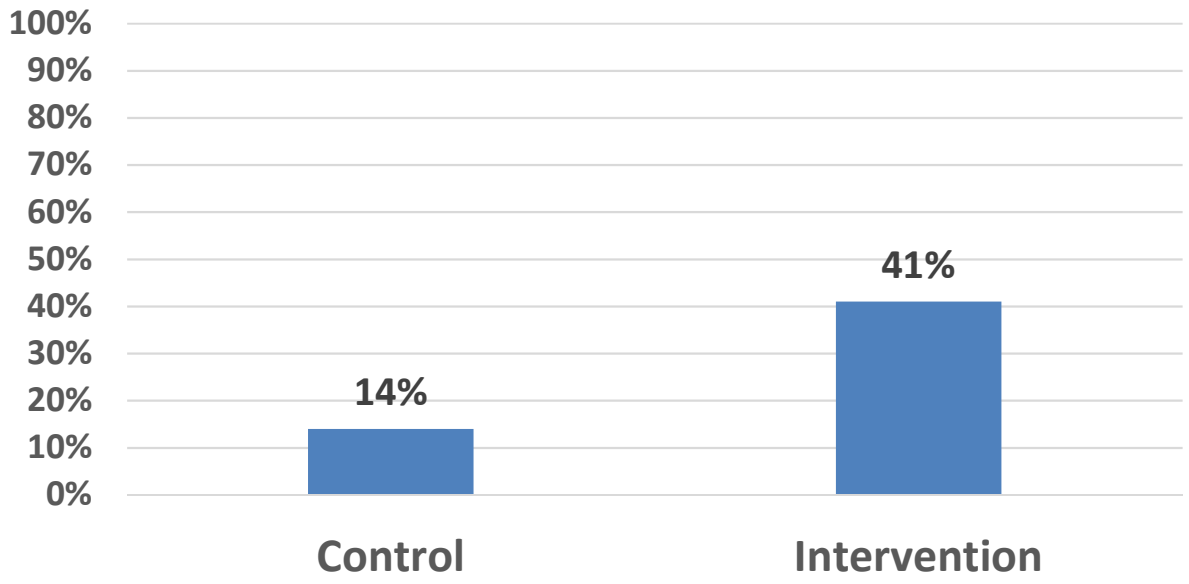
% Errors

- 20 item check list



Results

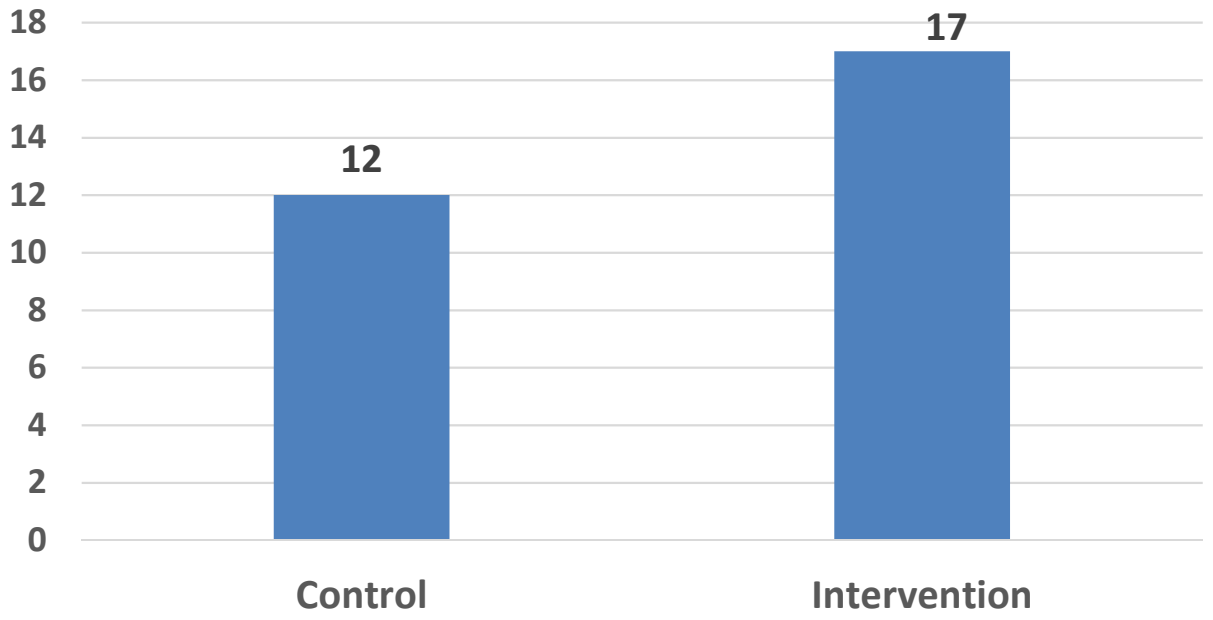
27% MORE CORRECT USE WITH NEW MATERIALS



p=0.042

Results

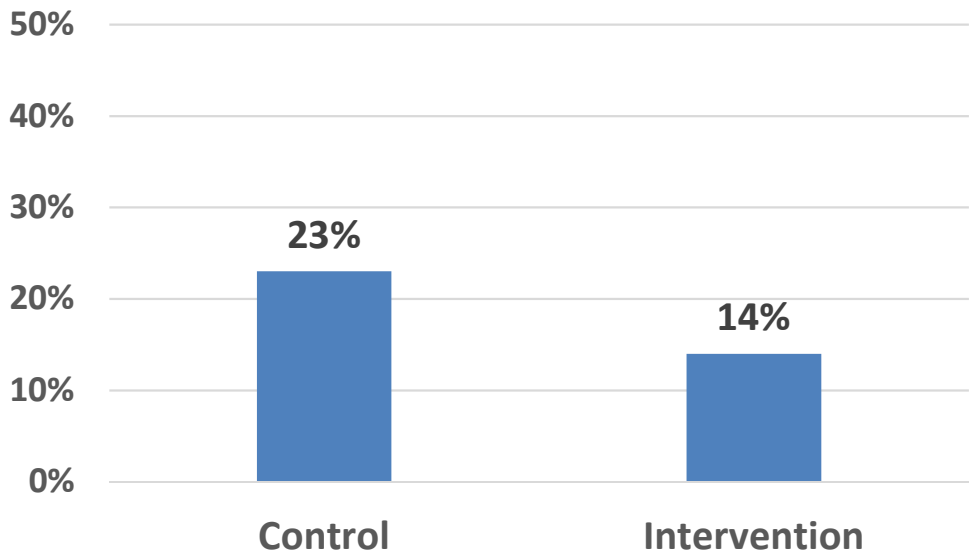
SIGNIFICANT INCREASE IN OMPREHENSION



p=<0.001

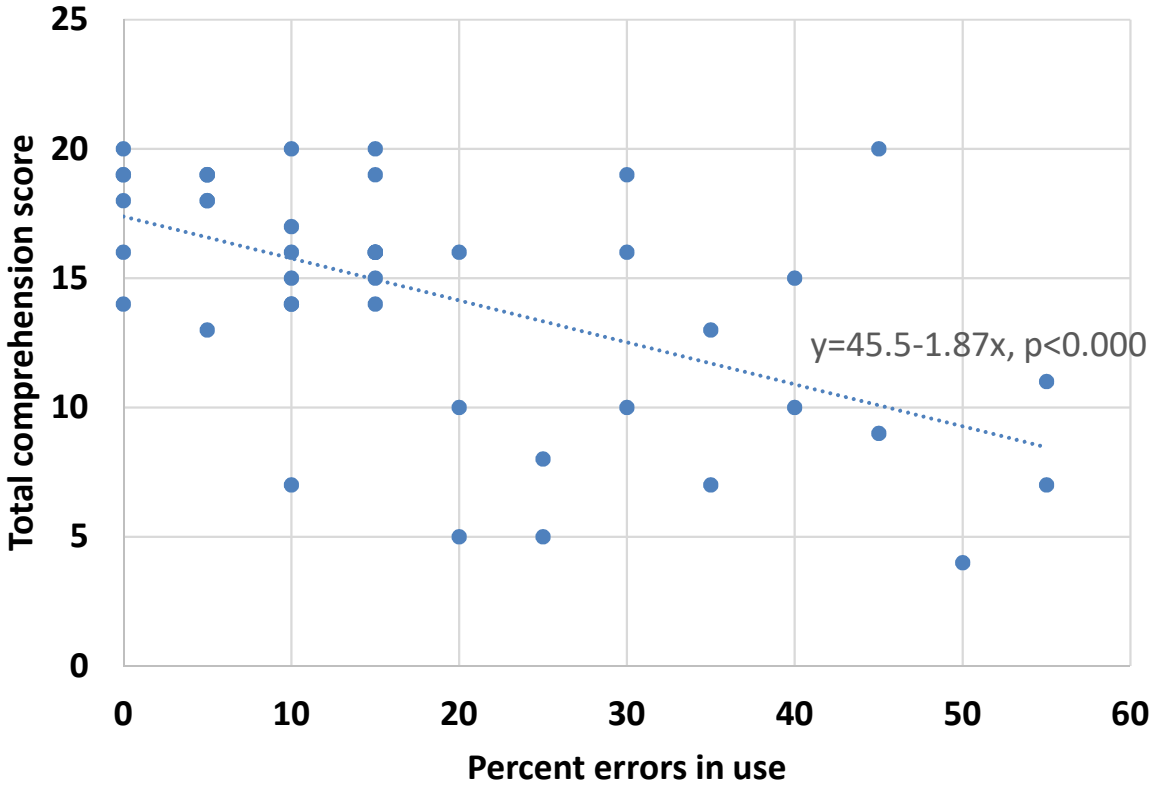
Results

ALMOST 10% REDUCTION IN THE OVERALL NUMBER OF ERRORS



p=0.056

Results


25
20
15
10
5
0
Total comprehension score
0
10
20
30
40
50
60
Percent errors in use
y=45.5-1.87x, p<0.000

Results

SUMMARY

- User-driven materials increase correct use by 27%
- User-driven materials increased comprehension by 42%
- Significant linear relationship between increased comprehension and reduction in errors

IMPLICATIONS

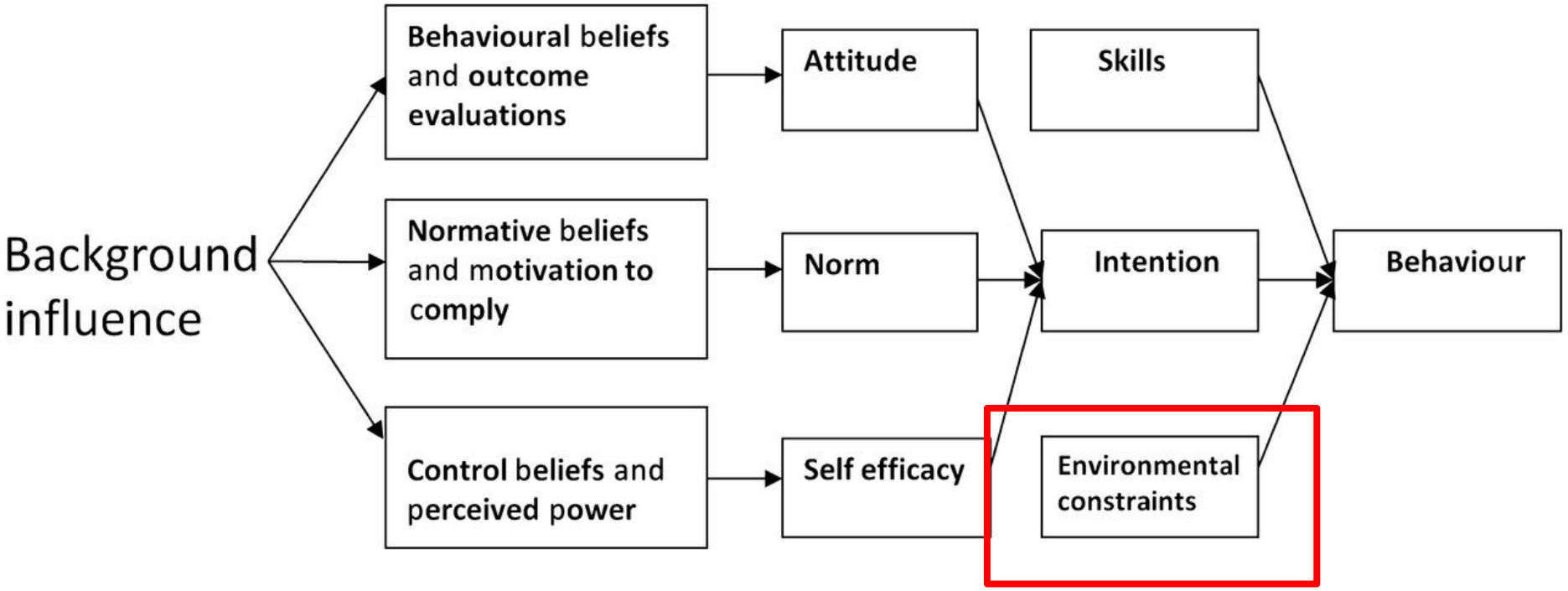
- Increasing the comprehension of instructions may be effective measure to counter misuse
- Improving instructions may be a cost-effective and far reaching intervention to reduce misuse
- User-driven design can increase comprehension and reduce serious errors in use

Limitations

- **Laboratory setting**
- **Immediate assessment**
- **Researcher present**
- **Dummy-child and not a real journey**
- **Participants included many non-parents**

NEED FOR A TRIAL UNDER REAL WORLD CONDITIONS

Background



Integrated model of behaviour (Fishbein)

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INJURY PREVENTION

Co-authors:
Alex Hall, Catherine Ho, Bianca Albanese, Lisa Keay, Kate Hunter, Jude Charlton, Lynne Bilston, Andrew Hayen,
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The George Institute for Global Health

MONASH University Accident Research Centre

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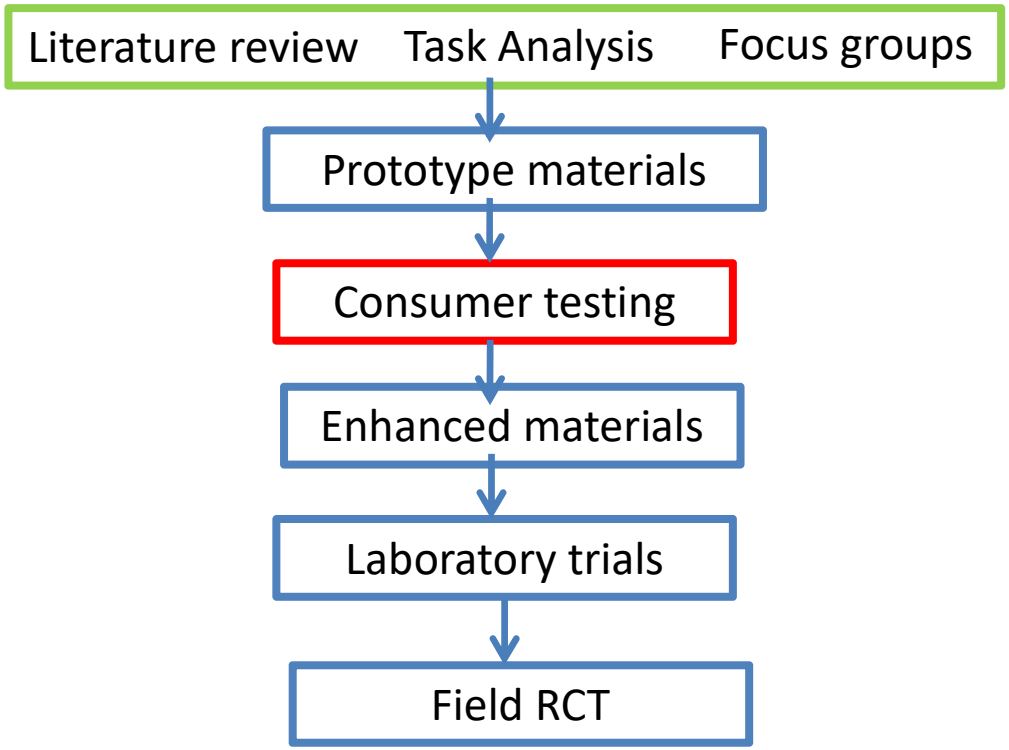
User-driven design of informative materials



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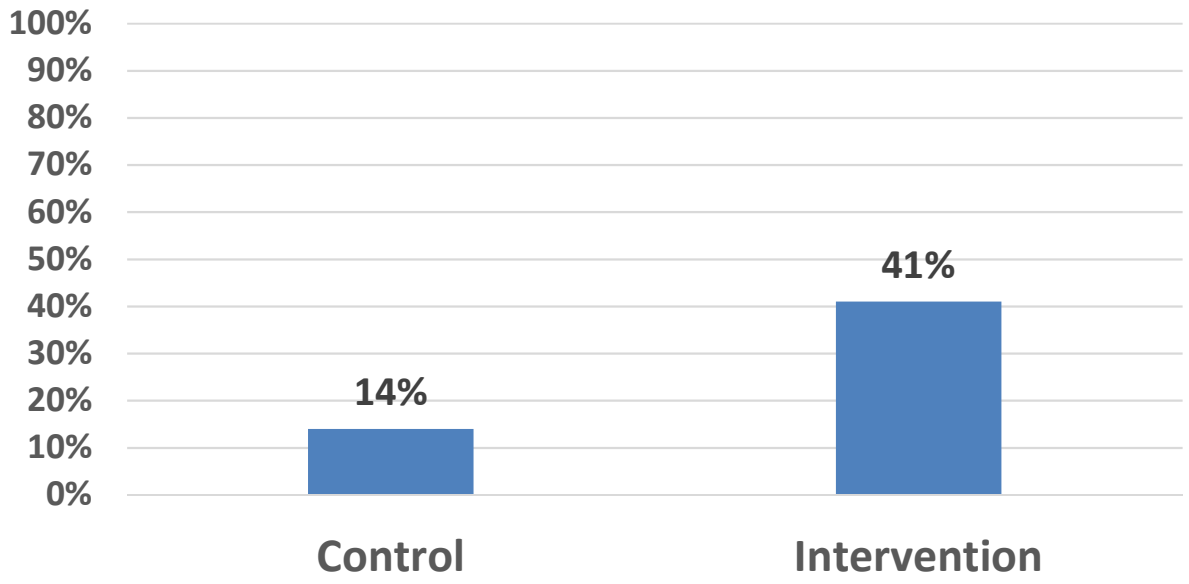

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