This is the reference list for page 12 of the 2016 Insights for Impact report.


This is the reference list for page 15 of the 2016 Insights for Impact report.


Neurocognitive effects of physical exercise in older adults

**Theme**
Cognition & neuroscience

**Domain**
Learning and Memory

**Proposed by**
Zea Szebeni

**Primary citations (max 2 – 1 original study; 1 review)**


**Most recent significant citation (2011-2015)**


**Highest dissemination**


**50-word summary of insight (non-technical)**

With increasing life expectancy, it is important to mitigate the decline in cognitive functioning associated with aging. Physical exercise is associated with improved brain and cognitive functions, even for those with limited physical capacity. Effective interventions with these insights are possible to deliver at a very low cost.

**Headline findings & critical numbers (simplify if overly technical)**

Deterioration of the hippocampus leads to memory impairment in late adulthood. Adults, who participated in moderate-intensity aerobic exercise 3 days/week demonstrated an increase in volume of the left and right hippocampus by 2.12 % and 1.97 %, respectively, over a year period. Adults who only did light stretching exercises on the there hand displayed 1.40 % reduction in the left and 1.43 % reduction in the right hippocampus.

Older frail and non-frail adults who participated in an exercise programme for 12 weeks (1h 3 days a week) had enhanced cognitive performance in processing speed, working memory and executive functioning compared to the control group who did not start such exercise routine.

Interventions which combine aerobic fitness with resistance training may be the most beneficial for promoting healthy cognitive functions for older adults.

**Cautions & limitations**

Positive findings have not been assessed for long-term benefits across elderly population nor if improved cognitive functions translate to everyday situations.

Insight headline: Brain-training apps and cognitive functioning

Theme: Cognition & neuroscience

Domain: Learning and Memory

Proposed by: Zea Szebeni

Primary citations (max 2 – 1 original study; 1 review)


Most recent significant citation (2011-2015)


Highest dissemination


50-word summary of insight (non-technical)

In recent years many brain-training applications emerged claiming that they can enhance cognitive functions. Even though users might improve in these games, it doesn’t mean that they get better in other tasks. ‘Simple’ video games usually achieve better results and users also find them more engaging and enjoyable.

Headline findings & critical numbers (simplify if overly technical)

Participants who played a video game (Portal 2) showed enhanced problem solving, spatial skills and persistence over participants who played a popular brain training application (Lumosity). Playing casual video games with elements associated with working memory and reasoning improved divided attention.

When playing casual video games participants improved on the trained games, but transfer to untrained tasks was limited.

Training on fewer tasks, such as video games - may be more beneficial in terms of transfer effects than training on a multitude of tasks, such as is brain-training applications.

Participants enjoyed playing the video game Portal 2 more than the training app Lumosity.

Casual action video games increase the ability to extract patterns in the environment, but this is only true in real-world settings which resemble elements from such games.

Cautions & limitations

Using brain-training applications to improve cognitive functions should not be disregarded, but a different approach might be needed for their design. Also, the marketing of such games can overshadow other ways of cognitive training (e.g. exercise). Long-term effects of the use of ‘brain-training’ applications are unknown, because of lack of the follow-up after training. Further, it has not been measured whether the improved skills are useful in real life settings.

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<th>Measuring the accuracy of eyewitness identification</th>
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<td>Nika Čermak</td>
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<td>50-word summary of insight (non-technical)</td>
<td>Eyewitness identification evidence is less reliable than the general public seems to believe. Mistaken eyewitness identifications can be attributed to several variables, including cognitive, social, and contextual characteristics. Awareness of these indicators can improve the chances of correctly identifying the suspect.</td>
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<td>Headline findings &amp; critical numbers (simplify if overly technical)</td>
<td>Children and older people are more likely to make a false identification (ID) in culprit-absent line-ups, relative to young adults. Simultaneous line-ups show lower false ID rates (11%) and slightly higher (43%) correct ID than rates sequential line-ups (18% and 41%, respectively). Witnesses are worse at correctly identifying suspects of a different race than themselves. People with low memory capacity, short attention spans, and who misattribute familiarity to the suspects perform worse at suspect discrimination. Short exposure duration, long viewing distance, and confirming feedback to witness can also decrease accurate identification. Discriminability is also influenced by social factors, such as susceptibility to social demands, an excessive willingness to help (mostly in older people) and suggestibility to biased instructions (mostly present in children).</td>
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<td>Cautions &amp; limitations</td>
<td>By applying these findings in practice we could lower the rate of false suspect identifications. However, even though simultaneous line-up yields more accurate suspect identifications, the witness might feel pressured to pick the line-up member who looks most like the perpetrator. Therefore, introducing this procedure and conclusions in practice would require adequate training and education of the professionals working in this field in order for them to understand and use them correctly.</td>
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Ten minutes of wakeful rest after a study session improves memory for the studied material. Memories from events occurring after the study session can interfere with the learned content. Wakeful rests postpone the interference and reduce the chance of information being lost from memory. Post-study rests boost recall in both healthy and amnesic individuals.

Headline findings & critical numbers (simplify if overly technical)
Post-study rests improve memory for stories and spatial positions. Wakeful rests enhance both short- and long-term recall. Seven days after the study session learners who took a rest remembered approximately 10% more of the studied content compared to learners who did not rest. The benefits of post-study rest seem more pronounced in amnesic individuals.

Cautions & limitations
The potential benefits of wakeful resting for learning complex materials and curriculum content remain to be explored. The benefits observed for amnesic patients are promising, but there is still need for a comprehensive evaluation of the clinical utility of this learning strategy.
**Insight headline**
Inequalities lead to risk-taking behaviour

**Theme**
Cognition & neuroscience

**Domain**
Behavioural Economics

**Proposed by**
Guillermo V. Carbajal

**Primary citations (max 2 – 1 original study; 1 review)**

**Most recent significant citation (2011-2015)**

**Highest dissemination**

**50-word summary of insight (non-technical)**
Societal increases in inequality, such as those following economic crises, as well as a personal loss of socioeconomic status may lead to riskier decision-making. One forebrain region has been identified as critical in these behaviours. Addressing context for these individuals may reduce risk-taking by those affected by reduced status.

**Headline findings & critical numbers (simplify if overly technical)**
- When experiencing a gain, greater activation of the ventromedial prefrontal cortex (vmPFC) induced safer behaviour in a gambling experiment, as an attempt to preserve the current state.
- When experiencing a loss, greater activation of vmPFC stimulated risky behaviour, potentially as an attempt to recover from the loss and go back to the previous state.
- Victims of inequality engaged in greater risk-taking behaviours compared to beneficiaries of inequality and those not experiencing inequality.
- Among victims, reduction of inequality contributed to decreased risk-taking.

**Cautions & limitations**
Current data was obtained from samples of university students and animal models in controlled environments.

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Insight headline: Cognitive habits reduce support for restorative justice

Theme: Cognition & neuroscience

Domain: Social Cognition

Proposed by: David Thomson

Primary citations (max 2 – 1 original study; 1 review)


Most recent significant citation (2011-2015)


Highest dissemination


50-word summary of insight (non-technical)

People higher in social standing attribute criminal behaviour to offenders' biological traits. Societies with lawmakers predominantly from elevated social classes prefer sentences intended to punish perpetrators rather than rehabilitate them. Reducing lawmaker class disparity may facilitate criminal reform through consideration of restorative punishment.

Headline findings & critical numbers (simplify if overly technical)

People from elevated social classes are 8% more likely to believe that individual traits and dispositions are determined by biological factors. People’s beliefs about social class were manipulated using mock journal articles describing it as being either biologically inherent or socially constructed. Those manipulated with the former type of article were significantly less likely to support restorative punishment for academic cheaters. 14% of those in elevated social positions score lower on support for restorative punishment than the minimum scores of those in lower social standing.

Cautions & limitations

These insights seem to be more exaggerated in societies with significant disparities between socioeconomic classes. However, the direction of this pattern is unclear, so immediate adaption for application may not produce meaningful effects if idiosyncratic inequalities are not understood in the place of application.

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