Motivation
The Raven’s Advanced Progressive Matrices task\(^1\) is one of the most widely used measures of fluid intelligence.

There is tantalizing evidence that Raven’s performance improves following extensive n-back training,\(^2\)\(^-\)\(^3\) yet the mechanisms governing these transfer effects remain largely unidentified.\(^4\)

Little is also known about the cognitive abilities that conspire to influence Raven’s performance, including interference resolution (or the ability to select among multiple conflicting options).\(^5\)

We examined the role of interference resolution in Raven’s by manipulating the degree to which answer alternatives conflicted with the correct response for problems.

One recent study linked performance on a similar version of modified Raven’s to working memory capacity.\(^6\)

Material Creation
Data from 188 participants across several studies was aggregated.

Incorrect answer alternatives were ranked in terms of interference based on how often they were selected by participants.

Versions of each Raven’s problem were created:
1. **High-interference** contained the 3 most selected incorrect options
2. **Low-interference** contained the 3 least selected incorrect options

Two complementary sets of problems were created with 18 high- and 18 low-interference problems.

Across 2 sessions, 20 participants performed each set.

Results

**High-interference items lead to worse performance than low-interference items, an effect that is uninfluenced by difficulty or session**

<table>
<thead>
<tr>
<th>Session 1, First Half (Easy)</th>
<th>Session 1, Second Half (Hard)</th>
<th>Session 2, First Half (Easy)</th>
<th>Session 2, Second Half (Hard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Accuracy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>High-Interference</td>
<td>Low-Interference</td>
<td>High-Interference</td>
<td>Low-Interference</td>
</tr>
<tr>
<td>GLMER: Main effect of Interference ($\beta=-0.91, z=-4.05, p&lt;0.001$) and no effect of or interaction with Session ($p&gt;0.55$); Main effect of Difficulty/Half ($\beta=-1.93, z=-5.52, p&lt;0.001$) and interaction with Session ($\beta=-0.81, z=-2.20, p=0.02$).</td>
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Interference type influences subjects’ responses to the same problem across sessions

<table>
<thead>
<tr>
<th>Switch from Correct</th>
<th>Switch from Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Trials</td>
<td></td>
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<tr>
<td>Low-Interference</td>
<td>High-Interference</td>
</tr>
</tbody>
</table>

GLMER: Interaction of Switch Type and Interference ($\beta=-0.09, z=-2.95, p=0.003$)

Conclusions

1. Replicating earlier work,\(^6\) interference among Raven’s answer alternatives negatively influences performance.

2. Subjects were willing to abandon a correct response to a problem in session 1 for an incorrect response to the same problem in session 2 when interference was amplified.

3. The results suggest a role of interference resolution for Raven’s performance, which may have implications for understanding training/transfer effects of fluid intelligence.


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