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Abstract:

Three experiments tested the prediction that incubation effects are caused by interactions between activation and environmental clues. Participants worked on 20 experimental problems and then were informed that they would have a second chance to work on the problems. Half were told they might see clues before returning to the problems and were instructed to try to use such clues. Participants then had an incubation period during which they generated words from the letters of test words. The test words were either semantically related to experimental problem answers, the actual answers, or unrelated words. Finally, all participants again tried to solve the experimental problems. Resolution, calculated as the number of items solved during the second trial that were not solved initially, was measured. Participants who saw answers during incubation resolved more items than those who saw related words. In Experiment 3, participants receiving no instructions did not differ across clue conditions, whereas instructed participants who saw answers resolved more problems than those who received related words. Participants in the instructed and unrelated condition performed significantly worse than those in the instructed and answer condition. Incubation effects occurred only when participants who were shown answers were also given instructions. No support was found for the theory that incubation effects are caused solely by environmental clues and activation.

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Использование внешних ключей во время инкубации.

Резюме:

В трех экспериментах было проверено предположение, что эффект инкубации вызывается взаимодействием между активацией и внешними ключами. Испытуемые решали 20 экспериментальных задач, и затем узнавали, что у них будет второй шанс над ними поработать. Половине из них сообщалось, что до возвращения к работе над проблемами они могут встретиться с ключами к их решению, и их просили постараться использовать

подобные ключи. Затем у испытуемых был инкубационный период, во время которого они составляли слова из букв другого слова. Тестовые слова были либо семантически релевантны ответам на экспериментальные задачи, либо буквально были ответами на них, либо были совсем нерелевантными. В последней части задания испытуемые снова делали попытку решить экспериментальные задачи. Измерялось, сколько задач было решено на 2 этапе из тех, что не были решены на первом. Участники, встретившиеся с ответами в инкубационном периоде были в этом более успешны, чем те, кто видел релевантные слова. В Эксперименте 3 не было различий по виду ключа в не-информированной группе, тогда как в информированной группе испытуемые, встретившиеся с ответами, дорешали больше задач, по сравнению с группой, получившей релевантные ключи. Инструктированные испытуемые, встретившиеся с нерелевантными ключами, были значимо менее успешны, чем информированные с ключами-ответами. Эффект инкубации наблюдался только на пересечении условий информированности и ключа-ответа. Не были подтверждены предположения теории, что инкубационные эффекты зависят от внешних ключей и активации.

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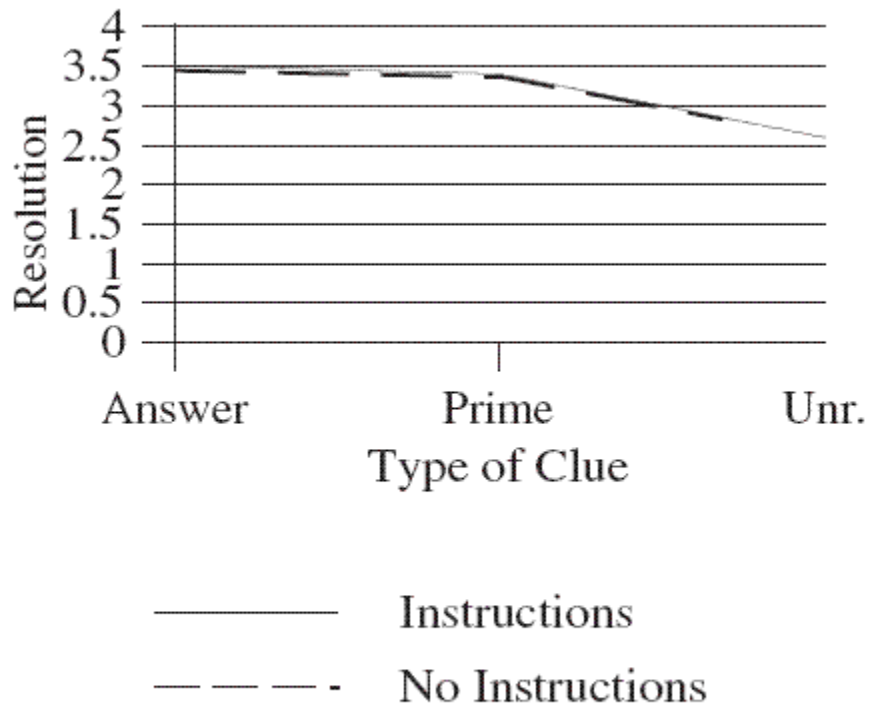


Figure 1. *Theoretical Results: Activation and Failure Indexes Theory Correct*

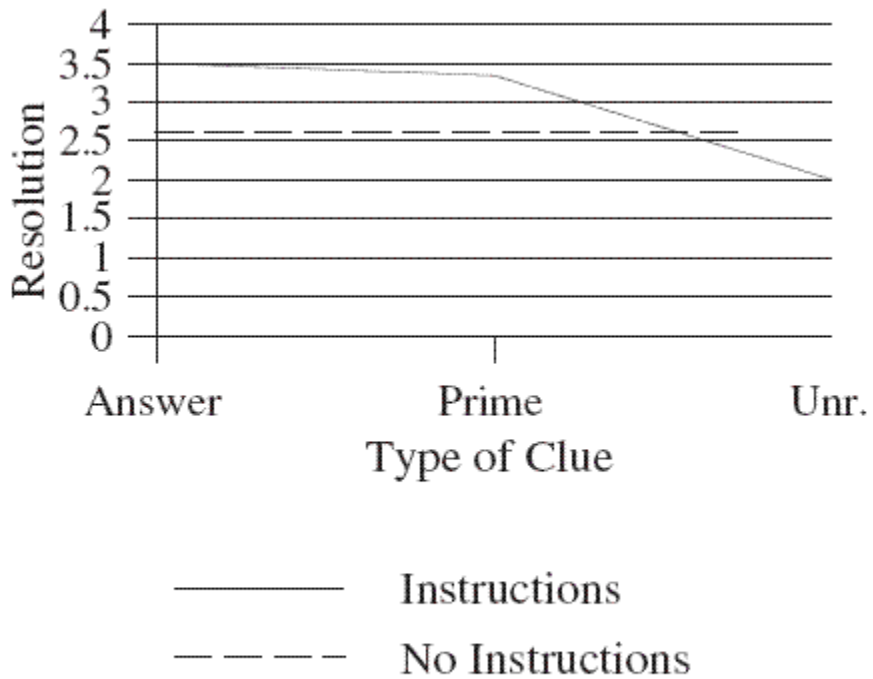


Figure 2. *Theoretical Results: Activation and Failure Indexes Theory Incorrect*

Table 1. *Experiment 1: Mean Resolution Scores in Clue Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer	3.26 ^a	2.06	61
Related Word	2.25 ^b	1.59	51
Unrelated	3.17 ^a	2.28	52

Note: Means with different superscripts differ significantly at $p < .05$.

Table 2. *Experiment 1: Mean Resolution Scores in Clue × Instruction Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer			
No Instruction	2.97	1.83	31
Instruction	3.57	2.25	30
Related Word			
No Instruction	2.38	1.58	24
Instruction	2.15	1.61	27
Unrelated			
No Instruction	3.46	2.21	26
Instruction	2.88	2.36	26

Table 3. *Experiment 2: Mean Proportion of Resolution in Control Conditions and Clue Conditions With No Instructions and No Fixation Manipulations*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer	.34	.20	25
Related Word	.25	.23	25
Unrelated	.30	.19	21
Immediate Control	.28	.20	81
Delayed Control	.28	.18	50

Table 4. *Experiment 2: Mean Proportion of Resolution and Resolution Scores in Clue Conditions*

Condition	Mean Proportion	<i>SD</i>	<i>N</i>	Mean Resolution
Answer	.34 ^a	.22	107	3.40
Related Word	.25 ^b	.19	106	2.68
Unrelated	.33 ^a	.22	100	3.25

Note: Means with different superscripts differ significantly at $p < .05$.

Table 5. *Experiment 2: Mean Proportion of Resolution in Fixation Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
No Fixation	.30	.21	156
Fixation	.30	.21	157

Table 6. *Experiment 2: Mean Resolution Scores in Clue Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer	3.40 ^a	2.31	107
Related Word	2.68 ^b	2.02	106
Unrelated	3.25 ^{ab}	2.10	100

Note: Means with different superscripts differ significantly at $p < .05$.

Table 7. *Experiment 2: Mean Resolution Scores in Clue \times Instruction Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer			
No Instruction	3.14	1.97	51
Instruction	3.64	2.57	56
Related Word			
No Instruction	2.47	1.85	49
Instruction	2.86	2.16	57
Unrelated			
No Instruction	3.17	1.86	45
Instruction	3.31	2.29	55

Table 8. *Experiment 2: Mean Proportion of Resolution in Fixation \times Clue Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer			
No Fixation	.33	.20	56
Fixation	.34	.24	51
Related Word			
No Fixation	.25	.20	51
Fixation	.24	.18	55
Unrelated			
No Fixation	.32	.23	49
Fixation	.33	.22	51

Table 9. *Experiment 2: Mean Proportion of Resolution Fixation × Instruction Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
No Instruction			
No Fixation	.30	.21	71
Fixation	.30	.21	74
Instruction			
No Fixation	.31	.22	85
Fixation	.31	.23	83

Table 10. *Experiment 3: Mean Resolution Scores in Clue Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer	3.05 ^a	1.78	75
Related Word	2.58 ^{ab}	1.44	72
Unrelated	2.37 ^b	1.22	63

Note: Means with different superscripts differ significantly at $p < .05$.

Table 11. *Experiment 3: Mean Resolution Scores in Clue × Instruction Conditions*

Condition	<i>M</i>	<i>SD</i>	<i>N</i>
Answer			
No Instruction	2.66	1.56	38
Instruction	3.46	1.91	37
Related Word			
No Instruction	2.56	1.39	39
Instruction	2.61	1.52	33
Unrelated			
No Instruction	2.68	1.19	31
Instruction	2.06	1.19	32

Appendix A: Experimental Materials

Experimental Problems	Answers	Related Words	Distractors	Proportion That Solved
board, magic, death	black	hole	marker	.47
painting, bowl, nail	finger	print	broken	.31
bald, screech, emblem	eagle	America	tires	.71
walker, main, sweeper	street	road	floor	.71
chocolate, fortune, tin	cookie	oatmeal	soldier	.61
widow, bite, monkey	spider	web	love	.42
catcher, license, hot	dog	cat	plate	.36
duster, bed, weight	feather	pillow	room	.63
peach, arm, stop	pit	fruit	signal	.36
ship, outer, crawl	space	star	tunnel	.45
worm, scotch, red	tape	cassette	robin	.72
river, note, blood	bank	money	suicide	.36
hearted, feet, bitter	cold	winter	tender	.40
gravy, show, tug	boat	lake	wishbone	.63
sandwich, Canadian, golf	club	caveman	bacon	.59
motion, poke, down	slow	drive	pin	.45
news, tiger, doll	paper	write	stuffed	.36
made, cuff, left	hand	palm	tailor	.72
stool, powder, ball	foot	toes	milk	.40
wood, liquor, luck	hard	rock	cabinet	.40

Unrelated Words

candle	butterfly
electric	stalk
cabbage	Saturday
there	surprise
slicker	window
staff	friend
shout	stiff
habit	stat
gnome	king
soap	Southern

Insight Problem

Place 10 blocks in 5 rows with 4 blocks in each row.