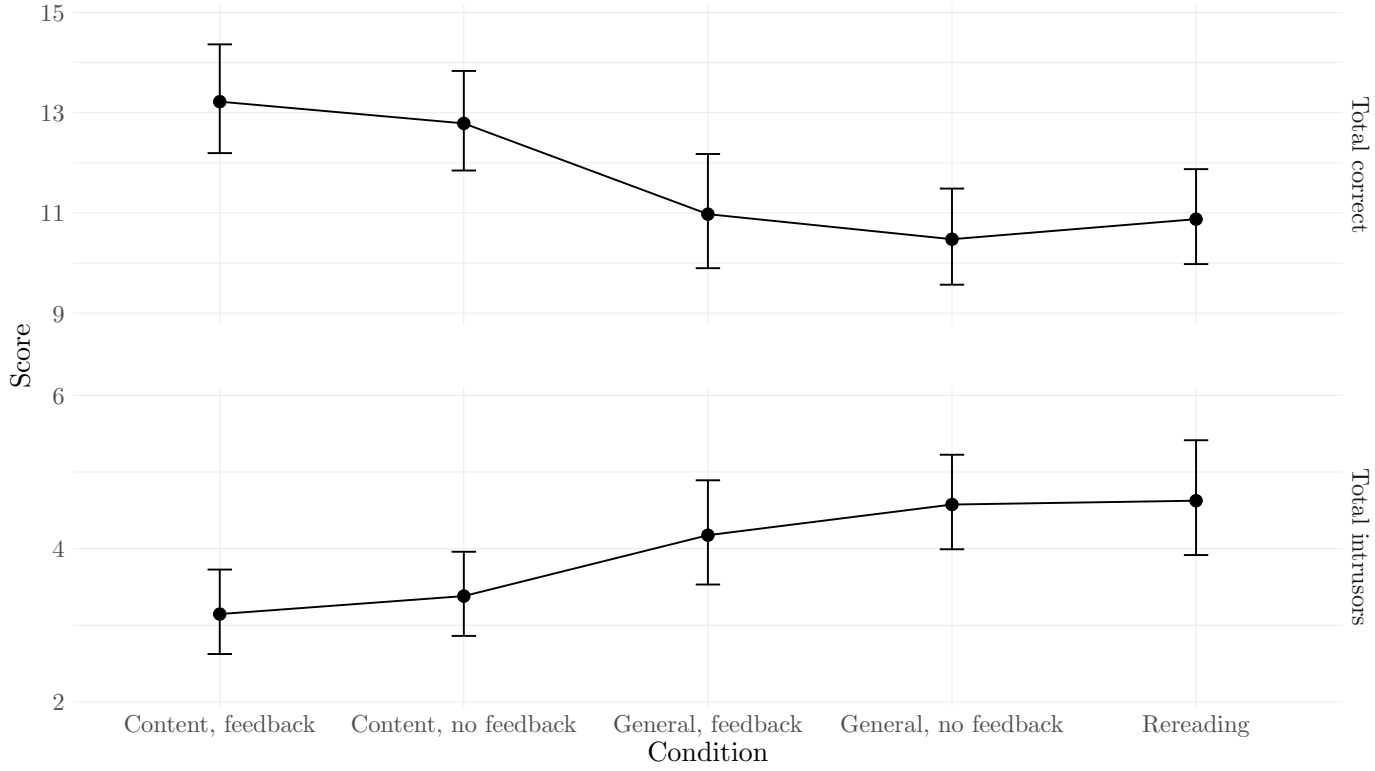
Table 1

Descriptive statistics for the DVs broken down by experimental condition.

Measure	Condition	n	M	SE_M	SD	min	max
Total correct	Content, feedback	41	13.22	0.508	3.25	2	19
	Content, no feedback	42	12.79	0.465	3.02	7	19
	General, feedback	40	10.97	0.533	3.37	1	17
	General, no feedback	40	10.47	0.449	2.84	5	16
	Rereading	40	10.88	0.443	2.80	4	17
Total intrusors	Content, feedback	41	3.15	0.258	1.65	0	7
	Content, no feedback	42	3.38	0.257	1.67	0	7
	General, feedback	40	4.17	0.318	2.01	0	8
	General, no feedback	40	4.58	0.288	1.82	1	9
	Rereading	40	4.62	0.350	2.21	1	10

Exclusion criteria

Prior to analysing the data, we excluded participants based on a priori set criteria. Participants who spent less than or equal to 90 seconds on the practice text were excluded (1 exclusion). Further, we wanted to exclude participants who had no correct answers on the final test (0 exclusions). Finally, we excluded participants who had stated that they had reading deficits (3 exclusions). This left us with a total sample of 203 participants. The descriptives for the sample are shown in Table 1.



Interpolated activity effect

Our first two hypotheses are concerned with the effects of different interpolated activities on the total number of correct answers and total number of intrusive distractors chosen. To test these hypotheses, we focused only on the groups which did not receive feedback ($n = 122$). This was done because there was no feedback option for the rereading group, and we did not want to treat the feedback and no-feedback general-knowledge and content-related testing groups as equivalent without strong evidence supporting that assumption.

The correlation between our DVs calculated on the whole sample is $r(201) = -.707$ (95% CI: [-.77, -.63], $p < .0001$). Given that we have two dependent variables, which are highly correlated, we have decided to conduct a one-way MANOVA. According to **?**, conducting a MANOVA instead of multiple ANOVAs increases the chance of discovering the effects of different treatments. Furthermore conducting a MANOVA guards against the inflation of Type 1 errors due to multiple tests of correlated dependent variables (**??**). Finally, conducting separate ANOVAs would disregard the correlation between our two dependent variables (**?**). Therefore, we conducted a one-way MANOVA with interpolated activity as the independent variable and the total number of correct and intrusive options chosen as dependent variables.

A power analysis conducted prior to analyzing the data (using the G*Power software by **?**) has shown that we should have above 80% power to detect effects which fall between small and medium (Cohen's $f^2 \gtrsim 0.06$), at an α level of .025, with a sample size of 110 participants. Note that larger effects are expected based on prior studies.

Pillai's V for the analysis is .126, $p = .004$ (Wilks' $\Lambda = .875$, $p = .003$). The effect size, calculated as $\omega^2_{mult} = .109$ (bootstrap median[1] = .132, BC_α 95% CI = [.011, .202])[2]. To further inspect the relationship of the interpolated activities with our dependent variables, we conducted a Roy-Bargmann stepdown analysis, as suggested by **?** (**?**; a linear discriminant analysis with the same aim is available in the supplementary materials). According to **?**, the higher priority variable can be chosen based on theoretical or practical grounds. Since the total number of correct answers is the criterion that determines a student's success in a testing context, we chose this dependent variable as the higher priority one. Therefore, we first conducted an ANOVA with interpolated activity type as the independent variable and the total number of correct answers as the dependent variable.

As could be expected, the ANOVA points to a differential effect of our conditions on the total number of correct answers, with $F(2, 119) = 7.541$, $p = .001$. Following the ANOVA, we conducted an ANCOVA, with

[1] All bootstrap estimates taken from 10000 replications.
[2] Cohen's $f^2 = 0.051$ (calculated according to Equation 12 in **?**).

the total number of correct answers as the covariate, and the total number of intrusors as the dependent variable. The results imply a main effect of the total number of correct answers ($F(1, 118) = 79.674$, $p < .0001$), but after we took into account the number of correct answers, we found no evidence for an effect of interpolated activity type on the total number of chosen intrusors ($F(2, 118) = 0.844$, $p = .433$). Thus far, results point to a lack of evidence to support our second hypothesis that the type of interpolated activity will have an effect on the number of intrusors.

In order to test our first hypothesis, we contrasted (i) the rereading group with the two test groups, and (ii) the two test groups with each other, taking only the total number of correct answers as the DV. The first contrast found no evidence of a difference between the rereading group and the two test groups ($t(119) = 1.355$, $p = .178$, $g_s = 0.19$, 95% CI = [-0.19, 0.57], Cohen's $U_{3,g_s} = 57.6\%$, probability of superiority = 55.39%). Therefore, we cannot conclude that being in the rereading condition, as opposed to being in one of the two test groups, leads to different learning outcomes. However, there was a difference between the two test groups ($t(119) = 3.62$, $p = .0004$, $g_s = 0.66$, 95% CI = [0.21, 1.1], Cohen's $U_{3,g_s} = 74.43\%$, probability of superiority = 67.88%). Students in the content-related-test condition score higher on the final test than students in the general-knowledge-test condition. These two findings are not in line with our predictions.

The interaction between feedback and interpolated activity type

The remaining hypotheses deal with the effect of feedback on the total number of correct answers and the total number of intrusors. Therefore, these analyses were carried out on the data from participants in the general and content related test conditions only ($n = 163$). To test these hypotheses, we first conducted a two-way MANOVA with interpolated activity and feedback as independent variables, and total number of correct answers and total number of intrusors as the dependent variables. Again, a power analysis conducted before analysing the data has shown that we should have above 80% power to detect effects which fall between small and medium (Cohen's $f^2 \gtrsim 0.05$), at an α level of .025, with a sample size of 145 participants.

Pillai's V for the interpolated activity effect (calculated with type III sums of squares) is .071, $p = .003$ (Wilks' $\Lambda = .929$, $p = .003$) confirming the main effect of interpolated activity type. The effect size $\omega^2_{mult} = .065$ (bootstrap median = .072, BC_α 95% CI = [.008, .140])[3].

On the other hand, we found no evidence for an effect of giving feedback on the linear combination of our two dependent variables — Pillai's V = .003, $p = .800$ (Wilks' $\Lambda = .997$, $p = .800$). The estimated effect size is $\omega^2_{mult} = 0$.

[3]Cohen's $f^2 = 0.063$, using Equation 12 from **?**.

Table 2

ANOVA and ANCOVA models for the second Roy-Bargmann procedure.

Term	SS	df	F	p
ANOVA				
Activity	109.393	1	11.200	.001
Feedback	3.904	1	0.400	.528
Activity x Feedback	0.045	1	0.005	.946
Residuals	1553.046	159		
ANCOVA				
Activity	0.301	1	0.175	.676
Feedback	0.173	1	0.100	.752
Total correct	63.216	1	36.760	$< .0001$
Activity x Feedback	0.813	1	0.473	.493
Activity x Total correct	0.862	1	0.501	.480
Feedback x Total correct	0.130	1	0.075	.784
Activity x Feedback x Total correct	1.229	1	0.715	.399
Residuals	266.551	155		

Furthermore, we found no evidence for an interaction effect between activity type and feedback — Pillai's V = .001, $p = .941$ (Wilks' $\Lambda = .999$, $p = .941$). The estimated effect size $\omega^2_{mult} = 0$.

Again, we conducted a follow-up Roy-Bargmann stepdown analysis. In the ANOVA model with the total number of correct answers as the dependent variable and the type of interpolated activity, feedback and their interaction as predictors, only the type of activity seems to be relevant ($F(1, 159) = 11.2, p = .001$). This result also shows that students in the content-related-test condition score higher on the final test than students in the general-knowledge-test condition, which should be no surprise given the results of the first stepdown analysis. In the second step, we fit an ANCOVA model with the total number of correct answers as the covariate. In this model, the type of interpolated activity ceases to be a relevant predictor ($F(1, 155) = 0.175, p = .676$). Therefore, we find no evidence for an effect of the type of interpolated activity nor of feedback on the number of intrusive distractors chosen. The full models are shown in Table 2.

To summarise, contrary to our expectations, we find no evidence of an effect of feedback on the total number of correctly answered questions. Also, we found no evidence for an interaction effect of feedback and type of interpolated activity on the total number of correct answers. The same findings apply to the predictions regarding the total number of intrusors chosen.

Constraints on generality

Deviations from the preregistered analysis plan

Initially, we had planned to do a robustness check of our findings using data with an additional exclusion criterion, based on the number of times each participant had read each of the three parts of the main text. This analysis was never conducted because (i) applying this criterion would have lead to unacceptably low power and (ii) the participants' estimates of the number of times they had read each part were similarly distributed across all conditions. Further, we had planned to conduct a TOST procedure to test whether there is no difference between the content-related and general-knowledge testing groups. This analysis was not conducted because we did find a difference. A Bayesian t-test was also considered for the same comparison, but was dropped early on due to some conceptual concerns.