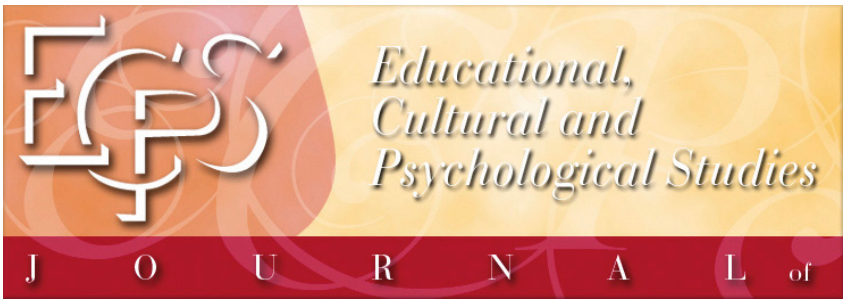

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Note di Ricerca
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The Relationship between Reflective Disposition and Persistence in Education

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IL RAPPORTO TRA L'ELABORAZIONE RIFLESSIVA E LA PERSISTENZA NELL'ISTRUZIONE

Abstract

Getting students to engage in reflective thought is a «wicked» problem in teaching. Students may demonstrate a resistance to any form of reflection, analysis or critical thought and instead automatically default to surface approaches which are non-productive in academic contexts. This resistance may involve an aversion which leads to students not persisting to higher levels of education and dropping out. The present study investigates the relationship between the resistance to reflective processing and persistence in education using the Cognitive Reflection Test (CRT) and some additional survey items aimed at testing surface processing tendencies in non-academic contexts. It provides support for the hypothesis that a general aversion to reflective processing appears to inhibit academic progression and correlates with drop-out from courses midstream. It closes by suggesting that aversion to analytical thinking may be a threshold issue that needs to be addressed separately before students can progress to any challenging content.

Keywords: CRT; Deep processing; Intuition; Reflection; Surface processing.

1. Introduction

One of the «wicked» problems faced by teachers at all levels of education is the reluctance of students to engage in deep or reflective processing of learning materials. Considered reflection, rather than mere surface processing or attention, is required to construct and retain the abstract concepts of academic learning, and to perceive and solve issues in a problem scenario. Students may manifest a decided resistance to this type of thinking. Aversions to reflective engagement are recognised in some specific domains, such as math anxiety (Ashcraft & Faust, 1994; Faust, 1996; Ashcraft & Krause, 2007; Foley *et al.*, 2017; Barosso *et al.*, 2021) and foreign language reading anxiety (Ghaith, 2020). Robinson (2018) has argued that such aversive reactions may apply more generally to reasoning that requires considered analysis rather than automatic, surface judgments.

If resistance to reflective processing is indeed an aversive state, one would expect it to have an impact on persistence in the education system. As students progress through the education system, the requirement for deeper reflective processing becomes more and more demanding, which may make the experience more and more aversive to students who are resistant to that style of thinking. Such an aversion may induce students to discontinue their studies at certain stages and even to withdraw from courses before completion. One of the difficulties with testing this theory is that progression through the education system may also be mediated by level of difficulty and higher demands on intellectual faculties rather than a fundamental aversion to reflection. What is needed to test the aversive effect is a measure of the reflective tendency which does not demand high levels of intellectual capacity or prior education.

The present study explores the relationship between the reflective tendency and educational persistence through the Cognitive Reflection Test (CRT). The CRT is a very easy-to-administer, three-item test which has demonstrated remarkably reliable associations with a wide range of variables thought to be influenced by reflective tendencies. Szaszi *et al.* (2017) refer to it as «a pivotal tool to measure a unique dimension of individual differences» (p. 207). Pennycook, Cheyne *et al.* (2016) call it «one of the most widely used tools to assess individual differences in intuitive-analytic cognitive styles» (p. 341). Stupple *et al.* (2017) report that it has «taken the reasoning literature by storm over the past decade as a test-bed for examining dual-process theories» (p. 2).

The items of the CRT consist of miniature problems which afford: (a) an alluring, intuitive response which is wrong; and (b) an easily calculable answer which is right. To answer correctly, it is necessary to resist

the tempting intuitive response and to reflect enough to find the correct answer. Although the problems are numerical, participants only require some facility in primary school arithmetic to work out the correct answer once the lure of the intuitive response is resisted. The key is that they must reflect, in the face of an attractive, intuitive response, to recognise that their intuition is wrong and to reframe the problem in a form that can be solved by simple arithmetic. This feature of the design is important because it negates the possibility that success on the CRT is merely a measure of domain-specific skills or talent, mediated by factors such as intelligence, numeracy or education. Early criticism argued that the CRT was just another intelligence or numeracy test, due to its correlation with IQ tests and the numerical format of its problems (see, for example, Welsh *et al.*, 2013). Subsequent research showed that performance on the CRT is also associated with cognitive outcomes unrelated to mathematics, such as:

- rejection of paranormal and supernatural beliefs (Pennycook *et al.*, 2012; Cheyne & Pennycook, 2013);
- atheism and agnosticism (Pennycook, Ross *et al.*, 2016);
- religiosity (Gervais & Norenzayan, 2012; Shenhav *et al.*, 2012; Bahçekapili & Yilmaz, 2017);
- moral judgments (Pennycook *et al.*, 2014);
- the ability to recognise «fake» news (Pennycook & Rand, 2018) and pseudo-profound nonsense (Pennycook *et al.*, 2015).

The three-item CRT is comprised of the following problem questions:

Question 1

A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents

Intuitive answer: 10

Correct answer: 5

Question 2

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes

Intuitive answer: 100

Correct answer: 5

Question 3

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days

Intuitive answer: 24

Correct answer: 47

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Although the correct answers can be readily found if one is prepared to reflect, the results of many studies show that even highly educated individuals fail to take that step. Many of these studies have involved university level participants whose performance on the test has been, on the whole, quite weak (Frederick, 2005, p. 29; Bialek & Pennycook, 2018, p. 1955). This in itself suggests that failed performance is due to a resistance to reflective thinking rather than any intellectual limitations of the participants. To cross-check this premise, we included additional items in the study to assess the tendency towards automatic surface processing in relation to the non-academic domains of news reading, food appreciation and social judgments.

2. Materials and method

2.1. *Participants*

The study was conducted as an online survey through the commercial company, SurveyMonkey, who drew the participants from their panel of volunteer respondents resident in the United States. The sample was guaranteed to be representative of the US census for adults, and this was reflected in the demographic analysis. There were 321 participants, 152 males and 169 females, aged between 19 and 89 years (M = 47.7 years). They came from all regions of mainland US, with greater concentrations located in the more populous regions. They were also spread across the full range of educational and income levels. Participants were presumed to have received a small compensation for their participation, since the charge to the research team was less than US$1.00 per participant.

2.2. *Materials and procedure*

The full survey with an opening Information Sheet and Consent Form, was submitted to participants online with responses received in data formats. The researchers had no direct contact with the participants and did not receive any identifying information.

Apart from the CRT items, the survey consisted of several demographic questions, two items aimed at eliciting information on persistence in education and attrition («Persistence items»), and three Likert-style

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items aimed at testing surface tendencies in non-academic contexts («Surface tendency items»). The persistence items and surface tendency items, along with the range of possible responses, are shown in *Table 1*.

Table 1. – Persistence and surface tendency items and possible responses.

Items	Possible responses
Persistence items	
What is the highest level of education you have completed?	Available responses ranged across 19 (mostly yearly) levels from «Did not attend school» to «Completed graduate school».
Have you ever commenced an educational course and then dropped out before completing it? If so, nominate the highest level of course you have dropped out of.	Available responses ranged across five levels: 1. No, I have never commenced a course and then dropped out; 2. Yes, I dropped out of school; 3. Yes, I dropped out of a vocational course; 4. Yes, I dropped out of a university course; 5. Yes, I dropped out of another type of course.
Surface tendency items	
Food-judging At a restaurant, what impresses me most about a meal is how it looks on the plate. *Face-valuing* When I meet someone new, I figure out what they are like almost immediately. *Headline-reading* When I check the news, I usually only look at the headlines.	Participants were required to choose from the response alternatives: • Strongly disagree • Disagree • Neither agree nor disagree • Agree • Strongly agree

There are competing views on how the CRT should be scored which mirror differing views on what it is testing. The traditional method scores correct answers only – we call this CRT-Regular. The idea is that, since the correct answers are relatively easy to find once reflection takes place, only correct answers can be taken to indicate genuine engagement in reflection. On the other hand, if the test is being interpreted to indicate resistance to the tempting intuitive response, one (arguably) should score only the intuitive answers – we call this CRT-Intuitive. CRT-Intuitive therefore, in theory, measures a slightly different construct from CRT-Regular, but, as Pennycook, Cheyne *et al.* (2016) observe, the forced-answer nature of the items and the comparative rarity of incorrect non-intuitive answers means that these two scales will invariably correlate strongly, and negatively (p. 343).

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A score on CRT-Regular can be thought of as an individual's reflective index, and a score on CRT-Intuitive can be thought of as an individual's intuitive index. We used both forms of scoring and found that while a strong negative correlation did normally prevail, the occasions when this expected correlation was absent were instructive.

3. Results

Cronbach's alpha for CRT-Regular was .734, which is higher than most other published figures for this scale (Campitelli & Gerrans, 2013, p. 439; Primi *et al.*, 2016, p. 454; Stupple *et al.*, 2017, p. 14; Bialek & Pennycook, 2018, p. 1955). This suggests that the informal context of the online survey did not undermine the systematic responding of the participants. For CRT-Intuitive, it was .640. Means and standard deviations for both scales are set out below (n = 321):

- CRT-Regular, M = 0.69, SD = 1.01
- CRT-Intuitive, M = 1.85, SD = 1.08

As expected, the two scales correlated strongly and negatively: $r(319) = -.741$, $p < .001$. Consistent with prior research, there was a significant gender effect:

- CRT-Regular: males (M = 0.89, SD = 1.10) scored significantly higher than females (M = 0.51, SD = 0.89), $t(290.0) = 3.37$, $p = .001$, two-tailed (equal variances not assumed).
- CRT-Intuitive: males (M = 1.66, SD = 1.12) scored significantly lower than females (M = 2.03, SD = 1.01), $t(305.9) = -3.12$, $p = .002$, two-tailed (equal variances not assumed).

There was a small positive correlation between age and performance on CRT-Regular which fell just short of statistical significance: $r(319) = .109$, $p = .051$, two-tailed.

3.1. *CRT performance and education*

We first examined performance on the CRT across different education levels to test our hypothesis that educational progression associates positively with the tendency towards reflection (as measured by CRT-Regular) and negatively with the tendency towards surface processing (as measured by CRT-Intuitive). Spearman's correlation revealed highly significant associations in the predicted directions – CRT-Regular: $r_s = .286$, $p < .001$; CRT-Intuitive: $r_s = -.151$, $p = .003$, single-tailed. *Table 2* shows the complete figures.

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Table 2. – CRT performance amongst adults who have achieved different education levels.

		CRT-Regular		CRT-Intuitive	
Highest education level	*n*	*M*	*SD*	*M*	*SD*
Incomplete high school (< grade 12)*	18	0.17	0.38	1.78	1.22
Completed high school	61	0.34	0.70	2.11	0.91
Incomplete college*	95	0.51	0.82	2.05	0.90
College graduate	82	0.99	1.13	1.60	1.16
Incomplete graduate school*	12	0.67	0.89	2.08	1.08
Completed graduate school	53	1.13	1.29	1.57	1.22

Note: * = «Incomplete» simply means that they have not completed at the time of the survey and have not gone on to a higher level of education. It does not, of itself, indicate drop-out. However, given the adult age of all participants, incomplete high school would suggest that they have ceased schooling.

Apart from the small sub-sample who identified as having commenced but not completed graduate school, which could include both current mid-course students and mid-course drop-outs, higher level performance on CRT-Regular was associated with higher levels of progression in the educational system. Performance by participants who had not progressed beyond high school was particularly poor. It should also be noted that college graduates and above were barely getting one answer correct on average, despite the simplicity of the problems.

Performance on CRT-Intuitive did not clearly manifest the anticipated reverse pattern. Participants at the lowest educational level (also a rather small sub-sample) were not significantly more likely to choose the intuitive answer than college graduates: $t(69) = .638$, $p = .556$. Given that participants at that low level also scored poorly on CRT-Regular, this result suggests that they failed to recognise or be attracted by the intuitive answer, as well as being unable to divine the correct answer. We cross-checked this finding by correlating CRT-Regular and CRT-Intuitive for students who had not completed high school. Although the sample size was small, the lack of the expected strong, negative correlation was notable: $r(16) = -.042$, $p = .868$.

3.2. *CRT performance and drop-out*

We next examined how CRT performance was related to drop-out rates from educational courses to test the hypothesis that resistance to reflection leads to increased drop-out. *Table 3* sets out the overall results for each of the scales.

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Table 3. – CRT performance and drop-out.

		CRT-Regular		CRT-Intuitive	
	n	*M*	*SD*	*M*	*SD*
Never dropped out	177	0.65	1.03	1.84	1.10
Dropped out of school	16	0.50	0.89	1.50	1.10
Dropped out of a vocational course	18	0.28	0.57	2.22	0.88
Dropped out of university	89	0.91	1.03	1.81	1.05
Dropped out of other course	21	0.57	0.98	2.10	1.09

Interpreting these figures raised a number of issues. The sample sizes for some of the categories were quite low and the appropriate comparison class was not always obvious. For example, the relatively good performance of university drop-outs can be explained by the fact that they showed the necessary persistence to get to that level in the first place. Compared to the overall rate for students who completed university at either college or graduate level (CRT-Regular: M = 1.01, SD = 1.17; CRT-Intuitive: M = 1.63, SD = 1.18), their performance was inferior. In addition, many of the participants who reported dropping out of courses often went on to complete those courses or higher courses at a later date. For this reason, our consideration of drop-out behaviour incorporated an analysis of educational level. In the following analysis, we only report statistical significance where the sample sizes warranted such an analysis.

Overall, participants who reported dropping out of non-university courses scored significantly lower on CRT-Regular (M = 0.45, SD = .83) than participants who did not (M = 0.74, SD = 1.04): $t(92.1) = 2.18$, $p = .016$, single-tailed (equality of variances not assumed). Mean difference on CRT-Intuitive was not significant.

The 16 participants who reported dropping out of school scored relatively low on CRT-Regular (M = 0.50) but also on CRT-Intuitive (M = 1.50), suggesting that they lacked both the associative skills to identify the intuitive answer and the reflective skills to work out the correct, non-intuitive answer. Of those participants, two ended up graduating from school and another five went on to college. This left only nine true school dropouts who averaged only 0.22 on CRT-Regular, a figure which nevertheless was higher than the nine students who did not complete high school without actually reporting having dropped out (M = 0.11).

Of the 18 participants who dropped out of a vocational course, four graduated from high school and the other 14 went on to college. As none of these participants actually failed to complete at least school level educa-

tion, they do not fit within the concept of true dropouts, although their CRT-Regular scores were noticeably low (M = 0.28) and CRT-Intuitive scores noticeably high (M = 2.22).

Of the 21 who dropped out of another non-university course, all had graduated from high school and all but one went on to college. At the time of the survey, ten of them had graduated with college degrees and another two had completed graduate degrees. Nevertheless, their scores on CRT-Regular (M = 0.57) were not significantly different from the general category of school dropouts (M = 0.50) and on CRT-Intuitive they were comparatively high (M = 2.10 v M = 1.50). The latter finding suggests that, unlike school drop-outs, other non-university drop-outs did not have difficulty identifying the intuitive lure.

University dropouts provided the largest sample of dropout behaviour. Of the 89 students who confessed to dropping out of a university course, 25 graduated from a college course (either before or after the dropout) and 24 undertook graduate studies, with 19 of them having completed their graduate degree at the time of the survey. We were interested in those who dropped out and did not ultimately complete or progress to higher studies. The 40 participants who dropped out of university and did not complete or progress averaged 0.70 on CRT-Regular (SD = 0.94) compared to 1.01 (SD = 1.17) for the 147 participants who completed a university degree (including those who went on to graduate studies). This difference fell just short of statistical significance on the CRT-Regular scale (p = 0.06, single-tailed), but on CRT-Intuitive the difference was significant: M = 2.08 (SD = 0.97) v M = 1.63 (SD = 1.18), p = 0.01, single-tailed.

3.3. *The non-academic items*

We then analysed the three non-academic test items, namely food-judging, face-valuing and headline reading. To test our assumption that these items were each assessing the tendency towards automatic surface processing, we first performed inter-item Spearman's correlations. The results set out in *Table 4* suggest that, in accordance with the research design, all these items were tapping into a common construct, presumed to be some form of tendency towards surface processing in non-academic contexts.

A Mann-Whitney test indicated a small but significant gender effect for headline-reading: Males were less likely than females to rely only on headlines when reading the news: U = 14,966, z = 2.659, p = .008, r = .015.

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Table 4. – Inter-item correlations of non-academic items.

	Food-judging		Face-valuing		Headline-reading	
n = 321	r_s	*p*	r_s	*p*	r_s	*p*
Food-judging	–	–	.243	< .001**	.158	.002**
Face-valuing	.243	< .001**	–	–	.145	.005**
Headline-reading	.158	.002**	.145	.005*	–	–

Note: ** = Significant at $p < .01$ (single-tailed).

There were significant negative correlations between age and each of the three non-academic items:

- Food-judging v age: $r_s = -.167$, $p = .003$ (two-tailed);
- Face-valuing v age: $r_s = -.140$, $p = .012$ (two-tailed);
- Headline-reading v age: $r_s = -.200$, $p < .001$ (two-tailed).

Similar to the CRT, as age increased the inclination towards surface processing in these contexts decreased.

Based on the hypothesis that surface approaches to the non-academic items would associate negatively with CRT-Regular and positively with CRT-Intuitive, we then proceeded to examine the relationship between CRT performance and the non-academic items using Spearman's correlations. The results are shown in *Table 5*.

Table 5. – Correlations between CRT performance and non-academic items.

	CRT-Regular		CRT-Intuitive	
Item	r_s	*p*	r_s	*p*
Food-judging	-.230	< .001**	.153	.003**
Face-valuing	-.101	.035*	.053	.173
Headline-reading	-.088	.057	.107	.028*

Note: * = Significant at $p < .05$ (single-tailed); ** = Significant at $p < .01$ (single-tailed).

CRT performance on both measures showed highly significant correlations with a superficial, surface approach to food-judging. Surface approaches to social judgments based on faces were more strongly associated with resistance to reflection, as (inversely) measured by CRT-Regular, than with the intuitive approach measured by CRT-Intuitive. Headline reading was associated with both lack of reflection and tendency to intuitive approaches, but the correlation with CRT-Regular fell just short of statistical significance.

Consistent with the CRT findings, we then tested the hypothesis that surface approaches to the non-academic items are negatively associated with education level. We found a highly significant negative correlation between education level and surface approaches to food-judging (r_s = -.194, p < .001, single-tailed) and smaller negative correlations with the other non-academic items which fell short of statistical significance (face-valuing: r_s = -.084, p = .067; headline-reading: r_s = -.079, p = .080, single-tailed).

With respect to drop-outs, we found no significant differences between various categories of drop-outs and non-drop-outs on the non-academic items.

4. Discussion

The pedagogical distinction between surface and deep processing is similar to the cognitive distinction, popularised by Kahnemann (2011), between System 1 processing, which is automatic, intuitive and heuristically based, and System 2 processing which is more deliberate, effortful and reasoned. Houdé (2010) has argued that the construct of intelligence is comprised not only of inter-individual differences reflected in IQ but also intra-individual differences reflected in the ability to inhibit System 1 processing in favour of System 2 – known as inhibition control. The CRT is considered to be a test of this ability.

Using the CRT, this study provides some support for the theory that persistence in education is influenced by the extent of students' resistance to superficial, intuitive judgments and inclination towards deeper, reflective processing. This finding raises the issue of determining cause and effect. For reasons stated earlier, we would be disinclined to accept the theory that higher levels of education actually teach students the skills required to solve the CRT problems, because the educational level required to correctly answer the CRT falls far below the educational levels where CRT effects are found. Even at the highest levels of education, average performance on the CRT is well below a pass threshold of 50%.

To test this view, we introduced a secondary enquiry involving three non-academic items for which any tendency towards reflection could not be attributed to an intellectual or educational prerequisite. These items correlated with CRT performance, supporting the theory that the CRT does tap into surface v reflective tendencies as opposed to pure intelligence or educational level. The relationship between surface v reflective tendencies

and educational persistence was further supported by correlations between the non-academic items and educational persistence, although no effect was detected for actual mid-term drop-out from courses.

More plausible is a theory that greater exposure to higher education conditions students to effortful reflective processing. In that sense, education could be seen as contributing to a students' development of reflective tendencies. Such a theory is not inconsistent with the premise of this article, that an aversion to reflective processing correlates with lack of persistence in education and attrition. In psychological terms, an aversive reaction can be associated with either avoidance (equating with non-persistence and attrition) or gradual conditioning towards a non-aversive state (equating with higher educational persistence and achievement). Both types of behaviour can be associated with alleviation of the aversive reaction.

However, despite this supposed alleviating effect of education, the educational benefits are clearly insufficient. Given the poor success rate on the CRT, it seems likely that in general students do not develop strong reflective inclinations simply through studying at higher educational levels. Nor are standard educational interventions likely to help. For example, if students get the CRT problems wrong, teaching them primary school arithmetic (again) is unlikely to be beneficial.

While a number of studies have explored, with some success, the possibility of training inhibition control, from a practical point of view they are limited and fall short of providing the «prefrontal pedagogy» recommended by Houdé and Borst (2015, p. 4). Many studies focus on children and adolescents in developmental stages and the training materials tend to be of a lower cognitive level than materials found in academic contexts (Karbach & Unger, 2014, p. 7). For example, many studies distinguish intuitive and non-intuitive tendencies via the Stroop Task, in which participants must respond on the font colour of colour words, which may be congruent (e.g. the word «green» is in green font) or incongruent (e.g. the word «green» is in a different coloured font). Incongruent words produce slower and less accurate responses. Such tasks present a choice between an automatic intuition and an effortless, non-aversive thought process, whereas even the basic CRT problems present analytical alternatives which require cognitive effort. In addition, the success rates for these training methods are somewhat inconsistent, particularly with respect to transfer of skills to different tasks or domains (Jolles & Crone, 2012, p. 3; Karbach & Unger, 2014, p. 1).

If one accepts the aversive characterisation of analytical thought, and the analogy with conditions like math anxiety, it may be more effective in academic contexts to desensitise students by bringing the problem of reflec-

tive aversion out into the open and to encourage students to become aware of their failing, so that they can address it by conscious, rational thought. The CRT problems provide a potential testbed for such an approach. By eliminating difficult domain-specific content and focusing on the thought processes themselves, it may be possible to «cure» the aversive reaction. The CRT problems can be provided at the outset of a lesson (not necessarily on mathematics) and administered in a matter of minutes. When students respond unsuccessfully, their failure can become a launching pad for an analysis of why they went wrong.

Because the CRT problems are inherently simple (at least in theory), they can highlight some typical issues:

- failure in academic work may be due to a person's resistance to reflection rather than lack of intellectual capacity or any genuine difficulty of a problem or subject matter;
- problems that look difficult on the surface often are not;
- surface approaches often produce wildly inaccurate, and sometimes patently wrong, results – in real world contexts, such results could be embarrassing.

These issues are important to recognise not only for students, but also for teachers. When students persistently fail on problems or concepts that the teacher regards as simple to understand and simply expressed, the teacher's typical reaction is to assume that the problem or concept is too difficult for the students. The teacher may then respond by making it easier, only to find that the students are still falling short. This can lead to subject matter being simplified to the point where it no longer reflects the real world scenario it is supposed to depict. The students' failings may have nothing to do with order of difficulty. Instead, there may be a threshold issue of the students resisting any form of reflective thought. Since they are not addressing the content, the difficulty of the content is irrelevant. The only solution, if there is one, may be to cure the threshold issue before embarking on the difficulties of content.

Our study also raised the possibility that students who do not complete high school not only struggle with engaging in reflective thought but also lack the associative mindware to identify intuitive answers. When, as in the CRT, the intuitive answer is wrong, that may not be a bad trait, but in broader practice it is probably problematic. Teachers of such students may face the challenge of addressing both issues. Our study does not suggest an obvious solution for the training of associative skills, but training in reflective processes may either have the side-effect of improving associative skills or at least compensating for the lack of them.

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Riassunto

Convincere gli studenti a impegnarsi nel pensiero riflessivo è un problema «complicato» nell'insegnamento. Gli studenti possono dimostrare una resistenza a qualsiasi forma di riflessione, analisi o pensiero critico e automaticamente per impostazione predefinita possono emergere approcci che non sono produttivi in contesti accademici. Questa resistenza può comportare un'avversione che porta gli studenti a non perseverare verso livelli di istruzione più elevati e ad abbandonare gli studi. Il presente studio indaga la relazione tra la resistenza all'elaborazione riflessiva e la persistenza nell'istruzione utilizzando il test di riflessione cognitiva (CRT) e alcuni elementi di indagine aggiuntivi volti a testare le tendenze di elaborazione delle informazioni di superficie in contesti non accademici. Si fornisce supporto per l'ipotesi che un'avversione generale all'elaborazione riflessiva sembri inibire la progressione accademica e correli con l'abbandono dei corsi a metà corso. Si chiude suggerendo che l'avversione al pensiero analitico può essere un problema che rileva la soglia da affrontare prima che gli studenti possano passare ad un'elaborazione più profonda dei contenuti.

Parole chiave: CRT; elaborazione di superficie; elaborazione profonda; intuizione; riflessione.

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