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Studying Students' Awareness of their Linguistic Progress

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ABSTRACT:

This paper attempts to study the capacity for self-evaluation of university students undergoing tests involving linguistic and formal reasoning. Subjects were asked to estimate the number of correct answers and subsequently to compare their performance with that of their peers. We divided the subjects into three groups on the basis of performance: poor, middle and top performers. The results demonstrate that all the subjects in all tests showed good awareness of their level of actual performance. Analyzing comparative assessments, the results reported in literature by Kruger and Dunning were confirmed: poor performers tend to significantly overestimate their own performance whilst top performers tend to underestimate it. This can be interpreted as a demonstration that the accuracy of comparative self-evaluations depends on a number of variables: cognitive and metacognitive factors and aspects associated with self-representation. Our conclusion is that cognitive and metacognitive processes work as "submerged" in highly subjective representations, allowing dynamics related to safeguarding the image one has of oneself to play a role.

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INTRODUCTION

Metacognition is the totality of psychic activities overseeing the cognitive function (Cornoldi 1995). These activities comprise the knowledge an individual has in relation to mental functions and mechanisms of control and self-regulation activated whilst carrying out first level cognitive activities. Metacognitive knowledge refers to what a subject knows or believes about a number of cognitive processes, such as memory, understanding, studies, etc. It may include ideas about cognitive functioning in general, convictions about one's own skills, the awareness of the existence of cognitive problems and one's ability to solve them, knowledge about the efficacy and use of strategies and personal strengths and weaknesses in this regard. All these elements may derive from personal experience or from the observation of the behaviour of others (De Beni & Moè, 2000).

Control and self-regulating mechanisms, on the other hand, play a guiding and supervisory role over cognitive processes. They include, for example, planning of the task, anticipating the performance, choosing a suitable strategy and verifying the choices made on the basis of the evaluation of results. The distinction between knowledge and metacognitive control derives from studies carried out in three parallel areas of research and which are the origins of the two leading aspects attributed to metacognition: studies into cognitive development following the developmental theory of Piaget (1974, 1975), the work of Vygotskij (1978) on the social origin of cognitive control and studies based on the Human Information Processing (HIP) model (Richard, 1990). Whilst references to developmental psychology and, in particular, to Piaget's theories, have stressed the awareness of the subject in relation to the functioning of his/her mental states, studies based on cognitive psychology and the HIP model have pointed to the role of control the subject can exercise over his/her cognitive activities. References to Vygotskij have underlined the central role of regulation mechanisms, the importance of cultural transmission and the educational role of the adult in relation to both metacognitive knowledge and the use of the various strategies.

Self-image and causal attributions

Within these variables it seems that an important place is occupied precisely by those personal factors which may act as a driver to activate, maintain and, if necessary, correct one's cognitive activity: the concepts of self-efficacy and the expectation of a result (Bandura, 1986, 2000; Mazzoni, 2000). The first referred to the degree of confidence of an individual in relation to the likelihood of achieving an objective he has set himself. The second

referred to the relationship between the way a task is carried out and the result the individual expects to achieve, given the way the task is to be carried out. Evaluations of self-efficacy varied on the basis of three dimensions: difficulty of the task, degree of generality/specificity of the evaluation and the strength of the evaluation. The generality/specificity dimension referred to the awareness an individual has of possessing some or many skills, whilst the intensity of the sense of self-efficacy referred to the degree of conviction an individual has in relation to his skills. There was a positive correlation between a high degree of conviction and good performance. This is because those with a high sense of self-efficacy persist in tasks where they initially fail (Bandura, 1986). Moè and De Beni (1995) distinguished between an objective of mastering a task (or learning aims) and the aim to achieve personal success. According to the authors, those who had the aim to achieve mastery wish to improve their culture, believed in co-operating with others and wanted to learn new strategies, applied them and thought that understanding is more important than memorizing. On the contrary, those who seeked personal success were motivated by the need to feel superior to others, they believed this was necessary in order to be successful without making much effort (Ames & Archer, 1988). Clearly this model was close to that of Dweck (1999) who distinguished between motivation based on mastery and motivation based on performance.

In 2002 Krueger and Mueller joined the debate by objecting that the phenomenon reported by Kruger and Dunning (1999) was in fact due to the joint action of heuristics called better-than-average and the statistical effect of regression. This heuristics consists in the tendency of people to assess themselves as above average: this excess of optimism is a highly irrational bias in that it is logically impossible for everyone to be above average (on the other hand, the assessments are given individually and hence the question does not arise in these terms).

The phenomenon of regression consists in the fact that the average of many repeated measurements tends to nullify the extremes: hence the self-evaluation values of subjects tends towards the average. Krueger and Mueller (2002) replicated the research of Kruger and Dunning (1999) applying some statistical controls to nullify the regression effect. In this way they highlighted the effect of focusing on oneself and the degree of confidence in estimates of performance as intermediate variables in the process. To sum up, in their opinion the hypothesis based on statistical regression and the heuristics of better than average, provide a more complete explanation of the results in question. In the same edition of the journal, Kruger and Dunning reaffirmed the consistency of the phenomenon even after statistical controls of regression.

Burson and colleagues took their results as evidence that the Kruger and Dunning (1999) pattern of over- and underestimation of relative performance was simply a function of using seemingly easy tasks and, as such, did not provide evidence of a relationship between skill level and accuracy in self-assessments.

They offered incentives (monetary and social) to encourage participants to provide accurate self-assessments and the results demonstrated that not only did incentives failed to improve assessment skills, but actually had the opposite effect: poor performers under incentives became more overconfident. Furthermore, this pattern of overestimation cannot be attributed to a mere statistical artefact, as suggested by Krueger and Mueller (2002), based on notions of statistical reliability and measurement error.

The phenomenon in question, i.e. the overestimation of one's own skills and/or the performance of less skilled subjects, is pervasive and can also be documented in areas which are very different from those of classic cognitive operations. It can be found in the appreciation of practical and professional skills: research carried out on chess players, hunters, doctors and nurses has reported the same phenomenon (Dunning, Johnson, Ehrlinger & Kruger, 2003).

If anywhere, the problem arises in the interpretation of these results and the explanation of the phenomenon: as we have seen, one of the most crucial problems relates to broadening the explanatory model via the inclusion of the variables Nisbett and Ross (1980) call "hot" and Piaget "extra-logical" and which, essentially, are related to one's self-image. It should also be stated that the phenomenon in question has strong applications significance in any learning process; in fact, as we highlighted in the introduction, the evaluation of the results of a test to a large extent determines the outcome of the process.

Present Study

The aim of the study was to investigate the ability to self-evaluate performance in tests of reasoning of a linguistic and formal nature, in a group of University students. Subjects were asked to provide one objective evaluation (number of correct answers) and two comparative evaluations (comparison with the performance and abilities of a group of peers).

More specifically, following the example of Kruger and Dunning, we intended to verify the hypothesis that subjects less skilled in cognitive tasks tend to overestimate themselves compared to their peers and that more skilled subjects, on the other hand, tend to underestimate themselves. We expected that, although the subjects can assess their performance quite accurately in objective terms, when asked to make a comparative assessment, they may make errors due to a lack of metacognitive skills and affective components. As Borkowski's model

explains (Borkowski et al., 2000), successful information processing results when there is an integration of these metacognitive and affective components.

Instruments

Three cognitive tasks, each with 20 item, were created using item taken from Test di Struttura dell'Intelligenza (Calonghi et al., 1974) and from Test di Intelligenza Non Verbale (Pearson & Wiederholt, 1998):

- a task of arithmetic involving the completion of number sequences according to a pattern
- a task of formal reasoning, taken from the, requiring subjects to complete sequences of geometrical shapes;
- a task of linguistic reasoning asking subjects to identify linguistic analogies, choosing two out of six words linked semantically.

Procedure

Our sample comprised 65 female students at the Faculty of Maragheh Islamic Azad University. Mainly female students attend this Faculty, but, as known from the literature, gender does not play a role in self-assessment abilities. Tests were set in groups and in such a way that upon completion, subjects were asked to estimate:

- how many correct answers they thought they had given (from 0 to 20);
- on a scale of 10, to assess their performance in that specific task "in relation to people who are similar to you";
- on a scale of 10, to assess their general ability in that domain, "in relation to people who are similar to you".

Essentially, with the last two assessments, we asked subjects to give themselves a mark from 1 to 10. To compare these assessments with actual scores (from 0 to 20) in the tests, we converted the scores out of 20 into a score out of 10.

Subjects were divided into three groups, poor, middle and top, each with about a third of the total sample, on the basis of the actual scores (see act. score) obtained in each task. For each task (arithmetic, formal reasoning and linguistic) a ANOVA, for repeated measures, 3 (groups: poor, average and top performers) x 4 (act. score, est. score, est. perf., est. abil.) was conducted to verify the effect of the group variable (between) on the scores (within). These were as follows:

- actual score (act. score) for the test (transformed into a mark out of 10);
- estimated score (est. score), i.e. the number of correct answers the subject thought she had given (also transformed into a mark out of 10);
- comparative assessment of performance (est. perf.), i.e. the score out of 10 attributed to herself by the subject;
- comparative assessment of ability (est. abil.), i.e. the score out of 10 attributed for ability.

RESULTS

The results of ANOVA [$F(6, 114) = 11.16$; $p < 0.00001$] showed significant differences among the three groups (poor, average, top performers) for the arithmetic test (Table 2). The group of "poor" performers obtained an actual score of M = 2.42 (SD = .60), out of 10 whilst the self-evaluation score was 5.22 for performance (see Table 1 and Graph. 1) and 5.89 for ability. In the group of "top" performers the actual score was M = 9.07 (SD = 0.79) with an average for self-evaluation 8.37 for performance and 7.75 for ability.

A second ANOVA was conducted on formal reasoning with group (poor, Average, top performers) as independent variable and actual score, estimate score, estimate performance and estimate ability as dependent variables.

The results of ANOVA [$F(6, 123) = 8.42$; $p < 0.00001$] showed significant differences among the three groups. For formal reasoning (see Graph 2), the group of "poor" performers obtained an actual average score, out of 10, of M = 2.80 (SD = 0.84), whilst the self-assessment of performance was 6.00 and the self-assessment of ability 6.30. In the "top" performers the average actual score was M = 9.29 (SD = 0.54), the average self-assessment of performance 8.00 and the average self-assessment of ability 7.58.

Table 1 - Average values out of 10 for actual scores, estimated number of correct answers, estimated performance and estimated ability for the "arithmetic task"

Items	Poor performers M (SD)	Average performers M (SD)	Top performers M (SD)
Actual Score 2	2.42 (.60)	5.31 (1.33)	9.07 (0.79)
Est. score 2	2.83 (2.75) 4	4.71 (2.06)	7.73 (3.09)
Est. perf	5.22 (2.59)	7.56 (1.21)	8.37 (2.19)
Est. abil.	5.89 (2.52)	7.13 (1.09) 7	7.75 (1.84)

Table 2 - Average values out of 10 for actual scores, estimated number of correct answers, estimated performance and estimated ability for the "formal task"

Items	Poor performers M (SD)	Average performers M (SD)	Top performers M (SD)
Actual Score 2	2.80 (0.84)	6.27 (1.43)	9.29 (0.54)
Est. score 2	3.50 (2.36)	5.66 (2.90)	7.32 (1.66)
Est. perf	6.00 (1.33)	7.32(1.25)	8.00 (1.28)
Est. abil.	6.30 (1.49)	7.46 (1.14)	7.58 (1.50)

Finally a post-hoc analysis was conducted using the Tukey method to verify significant differences among groups for the ability to estimate the number of correct answers in the three tasks. Analysis showed that in the highly skilled group the estimated number of correct answers was always less than the actual number of correct answers and this difference was significant in the linguistic task. In this group there is also a significant trend for the arithmetic and formal task.

CONCLUSIONS

In this manuscript we examined the capacity for self-evaluation of University students. We intended to verify the hypothesis that subjects less skilled in cognitive tasks tend to overestimate themselves compared to their peers and that more skilled subjects, on the other hand, tend to underestimate themselves. The results demonstrated that all the subjects in all tasks showed good awareness of their level of actual performance. Analyzing comparative assessments we found that poor performers tend to significantly overestimate their own performance whilst top performers tend to underestimate it.

We found also an increasing numerical difference between the actual score and the average self-evaluated score, which was smallest for the estimate of the number of correct answers and largest for the estimate of ability. Even within the comparative evaluations, there was an important difference: the evaluation of performance, in the specific test, was presumably very influenced by the feedback concerning the test: the subject knew if he/she has given the right answer to each question. The more general evaluation of ability for that type of test seems to reflect more self-image, irrespective of the test carried out. To formulate an explanatory hypothesis, we could begin with one fact which was also observed in the second study carried out by Kruger and Dunning in 1999): in the poor performers, the estimate of correct answers ("estimated score" in the graphs) was very close to the actual number of correct answers ("actual score" in the graphs). This means that the poor performers were well aware of how few questions they had got right. The discrepancy between self-evaluation and actual performance emerged only in the comparative evaluations, a metacognitive operation based on an uncertain, and essentially fictional, reference group. Comparative evaluation obliged subjects to refer their self-evaluation to an average level of performance that they did not and could not know, and this lack of any concrete data allowed them to fall back on defence mechanisms to safeguard their self-image; the lack of determination gave them room to use highly subjective criteria of self-evaluation. It's a bit like saying: "I didn't do the test well but I didn't do any worse than most other people". This leads to a kind of optimism in self-evaluation reinforcing one's self-image and seems to be centred more on the person than on the task. What comes to the fore is a self-focused defence mechanism which seems to correspond to the heuristic better than average, the general tendency to overestimate oneself compared to the average. In reality, in our opinion, it seems more that poor performers assessed average performance on the basis of their own performance, and hence underestimated it.

A more general way of looking at the phenomenon could start with the consideration that cognitive and metacognitive processes are regulated by highly subjective representations of oneself and the world around us. Nisbett and Ross (1980) dealt with these matters at the crossover of "hot cognition" (in which "errors" are explained by emotional and motivational dispositions) versus "cold cognition" (in which errors are the result of mistakes in processing information), and were led "to confess a prejudice on our part [...] that errors of inference and judgement originate not from motivational factors but from perception and cognitive factors".

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