Why Self-Esteem Helps to Solve Problems: An Algorithmic Explanation

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Why self-esteem helps to solve problems: Formulation of the problem. It is known that good self-esteem helps to solve problems; see, e.g., [1]. This is such a commonly known fact that people do not even realize that from the algorithmic viewpoint, this does not seem to make sense.

- From the algorithmic viewpoint, what we need to solve a problem is an appropriate algorithm and a sufficient amount of computation time.
- However, self-esteem does not mean we know new ways of solving the problem, it does not mean that we have gained additional time.

So why does it help?

Algorithmic result that we use to explain this phenomenon. There is a general computational result that uniqueness implies computability; see, e.g., [2] and references therein. In a nutshell, this result says that, in some reasonable sense:

- there is an algorithm that solves all the problems in which there is exactly one solution;
- on the other hand, no algorithm is possible that would solve all the problems – or, e.g., all the problems for which there are exactly two solutions.

Resulting explanation. For many problems given to K-12 students, there is exactly one solution.

- In these terms, self-esteem means that a student is confident that he/she can come up with a solution. By virtue of the above algorithmic result, this means that the student can, in principle, simply apply the general uniqueness-implies-computability algorithm and find the solution – even when this student is not yet fully able to apply techniques studied in class.
- On the other hand, without a good self-esteem, the student is not confident that he/she will come up with a solution. In such situation of non-uniqueness, no general algorithm is possible, so a student who is still struggling with the class material is, in general, not able to solve the corresponding problem.

References

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