Surprise in the Fostering of Rationality

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Introduction

The fostering of rationality has long been endorsed as an educational ideal by some educational philosophers.[1] In recent years, some have argued for this ideal, whereas others have challenged it, particularly within debates related to the promotion of critical thinking education.[2] An influential criticism of this educational ideal is that the fostering of rationality, by focusing on exclusively a rational enterprise evaluating the weight of reasons, undervalues the role that emotions can play in the process of learning. However, a question arises: Is it really the case that the fostering of rationality trivializes emotions? The answer to this question rests on whether or not – and if so, how – emotions, such as surprise, play distinct roles in the fostering of rationality.

This article explores the role played by surprise in the fostering of rationality, by critically examining Israel Scheffler's idea of cognitive emotion.[3] I will demonstrate that, contrary to the stereotypical view of the relationship between the fostering of rationality and emotions, surprise plays distinct and significant roles in the fostering of rationality. First, I will argue that surprise enables us to react to pertinent challenges, such as unexpected yet important questions, and thus offers an opportunity for us to reflect on them. Second, I will show how surprise can motivate us to consider the relevant results and facts that are newly recognized in the process of our learning.

I will focus on Scheffler's notion of cognitive emotion because, as is well known, Scheffler endorses the fostering of rationality as an educational ideal while at the same time scrutinizing the functioning of emotions that relate to learning, based on his study of pragmatism.[4] Still, how surprise as a cognitive emotion serves in the fostering of rationality has yet to be fully examined.[5] Thus, this article aims to analyze and extend Scheffler's idea of cognitive emotions, which will be a good starting point to develop contemporary research on emotion in the context of education.

My argument consists of four parts. In section 2, I will give a description of the fostering of rationality as an educational aim. In section 3, I will delineate some characteristics of surprise that matter to learning in the fostering of rationality. In section 4, I will demonstrate that surprise substantially contributes to the fostering of rationality in cognitive and affective respects. In section 5, I summarize the argument of this research.

The Ideal of the Fostering of Rationality

Let us first clarify the idea of the fostering of rationality as an educational ideal in accordance with Scheffler's view. Scheffler observes; "Rationality, as I see it, is a matter of *reasons*, and to take it as a fundamental educational ideal is to make as pervasive as possible the free and critical quest for reasons, in all realms of study."[6] To see rationality as a competence that must ideally be acquired through educational

PHILOSOPHY OF EDUCATION *2016* | Natasha Levinson, editor

endeavor is to see education as an activity that fosters rationality in children, so that they ideally learn to seek evidence and reasons and evaluate them on their own. This educational aim is said to be an ideal because this aim may never completely be fulfilled but still plays a guiding role in the fostering of rationality.[7]

What, then, justifies the fostering of rationality as an educational ideal? In the present literature on critical thinking education, which has developed from the research on the fostering of rationality, four distinctive justifications are provided.[8] One of the main reasons given by Scheffler for regarding the fostering of rationality as ideal for education is that, through such an education, children can equip themselves to be members of a democratic society. With regard to the democratic ideal, Scheffler gives a concise account:

> The democratic ideal is that of an open and dynamic society: open, in that there is no antecedent social blueprint which is itself to be taken as a dogma immune to critical evaluation in the public forum; dynamic, in that its fundamental institutions are not designed to arrest change but to order and channel it by exposing it to public scrutiny and resting it ultimately upon the choices of its members.[9]

A democratic society, as Scheffler conceives it, is such that citizens can deliberate issues about their lives in public and autonomously take proper measures to deal with them.[10] According to Scheffler, education helps in realizing this democratic ideal above. "The function of education in a democracy is rather to liberate the mind, strengthen its critical powers, inform it with knowledge and the capacity for independent inquiry, engage its human sympathies, and illuminate its moral and practical choices."[11] If educators achieve the goal of the fostering of rationality, as described above, children will be able to acquire abilities and character traits that will be called for if they are to become constitutive members of a democratic society.

Through education, therefore, children must develop not only develop skills and capabilities relevant to rationality, but also acquire character traits and dispositions that allow them to manifest such skills and capabilities appropriately. Scheffler writes:

> The relevance of rationality to character seems to me very great indeed. To learn to be critical while respecting one's colleagues in discussion, to learn to recognize one's fallibility, to commit oneself to following the argument on its merits and to take the consequences, to be sensitive to the standpoint of other persons with conflicting claims and different centers of experience, to learn to judge fairly and to take the responsibility for one's own judgments–these are lessons of morality and character no less than cognitive virtues.[12]

A child may be competent at evaluating the weight of reasons to support a claim while failing to be disposed to understand different views, thereby ending up a dogmatic rationalist. Similarly, although a child finds a reason compelling, she may never be motivated to base her action on the reason just because it is unfavorable to her. These cases strongly suggest that to become sensible citizens through the fostering of rationality, children must acquire character traits, such as fair-mindedness, to manifest their acquired skills in appropriate intellectual situations.[13]

The fostering of rationality as an educational ideal has induced an apparently convincing criticism, namely, that it undervalues the role that emotions play in the process of teaching and learning. Scheffler has responded that while his focus is mainly on the fostering of rationality, he has no intention of underestimating the roles

doi: 10.47925/2016.253

of emotions[14] and examines a variety of emotions that pertain to cognitive activities.[15] Let's explore the constitutive features of surprise in the fostering of rationality.

The Essential Features of Surprise as a Cognitive Emotion

As Scheffler views them, emotions that are relevant to cognitive activities come under two headings.[16] One category comprises emotions generally in the service of cognition. This encompasses "rational passions," "perceptive feeling," and "theoretical imagination."[17] These emotions may serve generally in any cognitive activities. For example, rational passions concern a love of truth and accuracy in observation and inference.

The other category comprises "cognitive emotions," the occurrence of which relies on specific cognitive contents, such as a certain result predicted before a survey or an experiment is conducted:

> Now I propose, analogously, to consider an emotion specifically *cognitive* if it rests on a supposition of a cognitive sort – that is to say, a supposition relating to the content of the subject's cognition (beliefs, predictions, expectations) and, in cases of special interest to us, bearing upon their epistemological status.[18]

A cognitive emotion can be understood as an emotion arising as a result of a change in cognitive contents, including a prediction induced from collected data and evidence. To illustrate, the joy of verification is a cognitive emotion that occurs when an experiment that is conducted verifies a result that has theoretically been anticipated.[19] The occurrence of this joy rests on the change in one's cognitive contents in two respects. First, one must have an expectation of a certain consequence based on reasons and evidence, prior to conducting the experiment. Moreover, the expected consequence must correspond to the data obtained as a result of the experiment. Given these two features, the joy of verification is different from the joy that one might experience as a result of sheer luck, such as winning the lottery.

Another example of a cognitive emotion is surprise. Although surprise is often seen as an example of a simple emotion, such as when we are surprised at an unexpected noise behind us, Scheffler is referring to surprise as it relates to inquiry. Let us now articulate and extend Scheffler's notion of surprise as a cognitive emotion by considering its function in the fostering of rationality as described in the previous section.

There are two constitutive features regarding surprise that pertain to the fostering of rationality. The first feature is that this surprise occurs only if a new belief attained as a result of our epistemic activity conflicts with beliefs that had been anticipated beforehand.[20] An example of a science class in which elementary children are taught the principle of pendular motion will illustrate this point. According to a report on the science class,[21] an elementary school teacher, showing an illustration of a pig who weighs 100 kg and a child who weighs 40 kg playing on swings, asked: "Which swings more times per minute, the pig or the child?" A number of the children answered that the pig swings more times than the child does. Afterwards, the children conducted a series of experiments on pendular motion and learned the law of physics that the pendulum's period of swing is in proportion to its length, not its weight. Interestingly, many children felt surprised, the report says, when ascertaining

doi: 10.47925/2016.253

the phenomena resulting from this law directly in their experiments. The children's surprise could probably be attributed to their attainment of an unexpected new belief about the pendulum's motion. Thus, the surprise that was registered in this report can be regarded as surprise occurring in relation to learning.

However, the phrase "beliefs that are anticipated beforehand" in the stipulation above needs to be accounted for in more detail. Suppose that a child walks down in a corridor of her school to buy lunch, as she has routinely done each day, and then is surprised when she slips on the floor. The child may unconsciously not have expected the floor to be slippery on the basis of induction from her prior experiences but was surprised at the unexpected fact of the condition of the floor that day. This surprise appears to be caused by her acquiring an unexpected, new fact. However, unlike the previous case of the surprise that occurred to the children in the science class, this surprise is not relevant to learning in the fostering of rationality.

How, then, can we deal with this problem? One way is to constrain "the beliefs that are anticipated beforehand" to beliefs that are anticipated by a learner on the basis of reasons and evidence, such as scientific evidence. As described in section 2, the goal of the fostering of rationality is for children to learn to seek reasons and evidence and to evaluate them on their own. In fact, children in the science class about pendular motion were asked not only to predict the result of the swing time but also to consider reasons to justify their prediction. Thus, we see that the children anticipated the result with reasons and evidence that they regarded as reliable. Children were surprised by the result of their experiments, because it did not correspond to their earlier expectations based on their reasons and evidence. Considering this case, let us restrict prior beliefs to those that a learner possesses based on reasons and evidence that he or she thinks are reliable.

Surprise as a cognitive emotion is essentially relevant to the epistemic activity involving reasons and evidence, but it can differ from surprise merely caused by a novel, unexpected situation that one encounters. The latter kind of surprise could arise even in situations where no reason or evidence is explicitly considered or provided in advance. Consider again the case of the child surprised by the slippery floor. This child might have unconsciously made an induction from past cases that the floor will not be slippery, and in this respect her surprise at the unprecedented situation might be related to some cognitive process. However, this process is distinct from the intellectual activity that explicitly considers reasons and evidence. Surprise that arises simply as a result of an unprecedented circumstance is thus excluded from surprise that relates to learning in the fostering of rationality.

The second feature of surprise as a cognitive emotion is that it occurs in relation to some impact on a view or theory of concern to a learner. Consider again the example of a science class focused on pendulum motion. The teacher formed a question that was associated with the children's daily experience and thereby aroused their curiosity about the way the pendulum moves. In this way, the children in this science class became concerned with the principle of pendulum motion. However, not all people are curious about this physical law and will therefore not be surprised by a new fact about it. This indicates that surprise can arise in the fostering of rationality

doi: 10.47925/2016.253

as long as newly recognized beliefs have some substantial impact on a view or a theory of concern to a learner.

This second feature will gain in importance when we consider the following possible case. Suppose that someone is surprised by any and every question and criticism. She might end up being overwhelmed by such a vast number of surprises and abandon her initial views and theories. However, there is a possibility that all the questions and criticisms may be dealt with or be irrelevant, and that her original, albeit still crude, ideas may later turn out to be significant. As this case indicates, it may be important to learning in the fostering of rationality for a learner to be surprised only by beliefs that are relevant to her process of learning.

Let us now summarize the two essential features of surprise involved in the epistemic activity of learning. This type of surprise occurs to a learner if and only if: 1) a learner obtains new information that conflicts with earlier beliefs whose reasons and evidence seemed reliable, and 2) the new belief obtained is relevant to a view or theory of concern to the learner. Here, a question arises with respect to stipulation (2). What enables a learner to be surprised only at beliefs that are relevant to the learning involved? In my interpretation, Scheffler answers this question by introducing the notion of receptivity to surprise, which enables the second feature of surprise. So, let me articulate this notion.

As Scheffler describes the relationship between receptivity and surprise:

> Receptive to surprise, we are capable of learning from experience–capable, that is, of acknowledging the inadequacies of initial beliefs and recognizing the need for their improvement. It is thus that the testing of theories, no less than their generation, calls upon appropriate emotional dispositions.[22]

Learning here, including the fostering of rationality, is presumed to be rational, and "learning from experience" means identifying the fault of one's earlier beliefs and recognizing the need for their revision. In the quotation, Scheffler argues that receptivity to surprise is necessary for learning from experience.

With reference to Michael Slote's clarification regarding receptivity,[23] receptivity can function not as passive acceptance but as selective acknowledgment of something that matters to an agent. In Slote's account, being receptive to intellectual challenges is not to blindly accept all questions and criticisms from others but to acknowledge important questions and compelling criticisms selectively.[24] This point could apply to perceptive recognition, including attentive listening. To illustrate, suppose that, while listening to her favorite song on her headphones, a young woman is spoken to by her friend. She will reply to her friend but later find that the song is over. The song was heard by her, even though she did not listen to it. As this example suggests, we may be selective in noticing information, and this phenomenon involves exercising receptivity, in Slote's description.

Considering this account, receptivity to surprise can work by selectively allowing a certain range of surprises. In particular, in the context of learning, this receptivity enables a learner to "select surprise" in the sense that a learner is surprised only at a belief that is relevant to his or her views or theories. Certainly, the notion of

doi: 10.47925/2016.253

receptivity to surprise could apply to surprise even about non-linguistic objects. For example, suppose that a man is walking his dog and hears it crying in an unusual voice. Looking into his dog's face, he notices that its eyes look pained. The difference might have been subtle and could barely be perceived by the owner, making him surprised. As in this case, although the idea of receptivity to surprise could be extensively generalized, for the present let us focus only on the case of surprise occurring in relation to learning in the fostering of rationality.

Remember that in the previous quotation, Scheffler argued for the necessity of proper emotional dispositions in learning from experience. Now, this statement may well be interpreted as meaning that, in order to be selectively surprised at relevant cognitive contents, a learner must possess receptivity to surprise as an emotional disposition. Although the intensity of this receptivity comes in degrees depending on the individual, let us suppose that this receptivity works sufficiently for a learner. What distinguishes relevant surprise from trivial or irrelevant surprise is the leaner's possession of receptivity to surprise. Therefore, this receptivity to surprise enables the functioning of surprise as a cognitive emotion as stipulated in (2).

The Distinct Roles of Surprise in the Fostering of Rationality

How does surprise, as defined in the previous section, contribute to learning in the fostering of rationality? In what follows, I will delineate the cognitive and affective roles of surprise.

Let us first consider the cognitive function. Surprise, arising spontaneously, enables an automatic response to matters relevant to the learning involved. For example, for the children predicting how the pendulum will move in the science class, surprise struck them before they began to reflect on the cause of the unexpected consequence. In this way, surprise generally enables a learner to respond unreflectively to new, unexpected information. This point will be illustrated by the analogy of a smoke detector.[25] A smoke detector serves as a sensor, reacting to what is registered as smoke in order to prevent a potential fire by making a loud noise to alert us. Similarly, as in the case of children in the science class, surprise occurring spontaneously can elicit a learner's immediate response to matters possibly relevant to the learning involved, such as an unexpected result.[26]

This cognitive function of surprise helps the learner to direct her reflective attention to a belief relevant to her learning, thereby making a substantial contribution to the fostering of rationality. Learners do not have to cast doubt on everything from scratch, except in a particular context, such as a skeptical argument. For example, it may be reasonable for the elementary school children in the science class to rely on the theory of Newtonian physics. Surprise can offer the learner a chance to identify the faults in her reasoning and the weaknesses in her argument. Although achieving these cognitive tasks surely calls for due consideration, surprise can help to make salient something that matters to the learning involved, so that a learner can re-examine her earlier view.

Let us proceed to the affective side of surprise. Surprise can motivate a learner to investigate reasons and causes further. For example, the children in the science

doi: 10.47925/2016.253

class may have been disappointed by confirming the unpredicted outcome of their experiments and finding that there was something wrong or missing in their reasoning. This experience might have deprived them of their intellectual curiosity about the pendulum's motion. As a matter of fact, acknowledging the fault of initial beliefs may sometimes render a learner discouraged.[27] Scheffler refers to such a circumstance, in which prior views prove to be incorrect and in which learning has to be reoriented, as "epistemic distress."[28]

What, then, can motivate a learner to consider the reasons and causes of the unexpected beliefs, particularly in epistemic distress? A motivating factor for this relearning may be the emotion of surprise, which can be accompanied by the recognition of a new discovery. Although the fostering of rationality aims at developing children's capabilities and dispositions to seek and evaluate reasons and evidence, how educators pose a question and induce children to consider reasons and evidence can differ, which may arouse varying degrees of surprise in children. Scheffler introduces the notion of "pleasant surprise"[29] and, in the educational context, this pleasant surprise could be construed as an emotion that helps to stimulate the learner's intellectual inquisitiveness, thereby motivating her to relearn.

Conclusion

I have discussed how surprise serves in the fostering of rationality in accordance with Scheffler's idea of cognitive emotion. First, surprise can serve as a sensor that reacts to pertinent challenges, including an unexpected result of an experiment. It thus offers an opportunity for a learner to reflect on them. Second, surprise can motivate a learner to consider reasons and evidence for relevant facts that are newly recognized. It can arouse children's inquisitiveness about a new discovery, even in epistemic distress. These cognitive and affective roles of surprise may constitute distinctive and significant contributions to the fostering of rationality. This demonstrates that surprise is conducive to the fostering of rationality, both cognitively and affectively. This conclusion will open up further exploration regarding how educational endeavors help learners foster an excellent emotional disposition, or emotional virtues.[30]

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1. See Emily Robertson, "The Epistemic Aims of Education," in The Oxford Handbook of Philosophy of Education, ed. Harvey Siegel (Oxford: Oxford University Press, 2009).

2. See Sharon Bailin and Harvey Siegel, "Critical Thinking," in *The Blackwell Guide to the Philosophy of Education*, ed. Nigel Blake, Paul Smeyers, Richard D. Smith and Paul Standish (Malden, MA: Blackwell, 2003) for a general overview of the studies of critical thinking.

3. "Critically examining" here means reconstructing and extending Scheffler's arguments to argue for unique roles that surprise can play in the context of education.

4. Israel Scheffler, *Four Pragmatists: A Critical Introduction to Peirce, James, Mead, and Dewey* (New York: Humanities Press, 1974).

5. There is certainly some literature on Scheffler's argument about cognitive emotion in the philosophy of education. However, the research is rather an application of Scheffler's idea than a critical exposition regarding his argument. For example, Iris M. Yob, "The Cognitive Emotions and Emotional Cognitions," in *Reason and Education: Essays in Honor of Israel Scheffler*, ed. Harvey Siegel (Dordrecht: Kluwer Academic Publishers, 1997), after clarifying the meaning of the term "cognitive emotions," discusses what she calls "emotional cognition." Jan Steutel and Ben Spiecker, "Rational Passions and Intellectual Virtues: A Conceptual Analysis," in *Reason and Education*, ed. Harvey Siegel (Dordrecht: Kluwer

doi: 10.47925/2016.253

Academic Publishers, 1997) center on what Scheffler calls "rational passions," which is different from cognitive emotion.

6. Israel Scheffler, *Reason and Teaching* (London: Routledge and Kegan Paul, 1973).

7. Harvey Siegel, "Israel Scheffler," in *Fifty Modern Thinkers on Education: From Piaget to the Present*, ed. Liora Bresler, David Cooper, and Joy Palmer (London & New York: Routledge, 2001), 144.

8. The idea of critical thinking as an educational goal is justified in terms of its relationship to a moral requirement in the educational setting, preparation for adulthood, its connection to rational educational enterprises, such as mathematics, and the demand of democratic citizenship. See Bailin and Siegel, "Critical Thinking," 189, and Harvey Siegel, *Educating Reason: Rationality, Critical Thinking, and Education* (New York: Routledge, 1988), 55-61, in more detail.

9. Scheffler, *Reason and Teaching*, 137.

10. I believe that Scheffler's idea of a democratic society can provide a baseline for the contemporary debate over the epistemic nature of democracy. See, for example, Elizabeth Anderson, "The Epistemology of Democracy," *Episteme* 3, no. 1-2 (2006): 8-22. I confine the present argument to the relationship between a democratic ideal, as Scheffler describes, and education.

11. Ibid., 139.

12. Ibid., 64.

13. The idea is also endorsed by arguments in literature on critical thinking and virtue epistemology. See, for example, Heather Battaly, "Teaching Intellectual Virtues: Applying Virtue Epistemology in the Classroom," *Teaching Philosophy* 29, no. 3 (2006): 191-222, and Richard W. Paul, "Teaching Critical Thinking in the Strong Sense: A Focus on Self-deception, World Views, and Dialectical Mode of Analysis," *Informal Logic* 4, no. 2 (1981): 2-7.

14. Scheffler, *Reason and Teaching*, 78.

15. Israel Scheffler, *In Praise of the Cognitive Emotions and Other Essays in the Philosophy of Education* (New York: Routledge, 1991).

16. It is known that emotion has a wide range of diverse dimensions: duration, focus, complexity, physical manifestation, degree of consciousness, degree of development, and degree of action-connectedness. See Peter Goldie, "Emotion," *Philosophy Compass* 2, no. 6 (2007): 928-38. Here I categorize emotions in the way in which Scheffler describes them.

17. Scheffler, *In Praise of the Cognitive Emotions,* 9.

18. Ibid., 9 (emphasis in original).

19. Ibid., 10.

20. Ibid., 12.

21. Hattori Shinichi, "Kishuu no kagakutekichisiki wo kangaete katuyousaseru jyugyou" [A Modeling Science Class that Can Motivate Children to Think For Themselves Based on Learned Knowledge], 2014,

http://www.shinko-keirin.co.jp/keirinkan/tea/sho/jissen/rika/201411/index.html (translation by the author).

22. Scheffler, *In Praise of the Cognitive Emotions,* 12.

23. Michael Slote, *From Enlightenment to Receptivity: Rethinking Our Values* (New York: Oxford University Press, 2013).

24. Slote, *From Enlightenment to Receptivity*, 212.

25. See Kunimasa Sato, "A Sensitivity to Good Questions: A Virtue-based Approach to Questioning," *Episteme*, 13, no. 3 (September 2016): 329-341.

26. Admittedly, just as a smoke detector occasionally misrepresents something harmless as a smoke that signals a big fire, so surprise may make a learner respond to challenges that will later turn out to be irrelevant to the learning involved. Still, the more intense receptivity to surprise is, the less likely it is to allow for this misrepresentation.

27. Confronting relevant questions and persuasive criticism may not be always painful but rather can be pleasant to some people such as academic experts or teachers.

doi: 10.47925/2016.253

28. Scheffler, *In Praise of the Cognitive Emotions and Other Essays in the Philosophy of Education,* 12.

29. Ibid., 14.

30. I believe that Katariina Holma, "Fallibilist Pluralism and Education for Shared Citizenship," *Educational Theory* 62, no. 4 (2012): 397-409 shares the concern with how emotional virtue serves education.

doi: 10.47925/2016.253