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Adaptive Intelligence: Its Nature and Implications for Education

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Abstract: This article introduces the concept of adaptive intelligence—the intelligence one needs to adapt to current problems and anticipate future problems of real-world environments—and discusses its implications for education. Adaptive intelligence involves not only promoting one's own ability to survive and thrive, but also that of others in one's own generation and in future generations. The article opens with a discussion of some of the strengths but also the limitations of the concept of general intelligence. It then discusses the concept of adaptive intelligence. Then, it breaks down adaptive intelligence into its constituent parts—creative, analytical, practical, and wisdom-based skills and attitudes. Finally, it discusses how the concept of adaptive intelligence can be operationalized in schools.

Keywords: intelligence; adaptive intelligence; teaching for adaptive intelligence; analytical ability; creative ability; practical ability; wisdom-based ability

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1. Introduction

Tests of general intelligence predict many individual everyday life criteria, at least at modest to moderate levels [1–3]. But is that all, or even most, of what there is to intelligence? Historically, intelligence has been defined as adaptation to the environment plus more, even, curiously perhaps, by those who developed or promoted somewhat limited tests of general intelligence [4–8].

Let us define adaptive intelligence as the intelligence one needs to adapt to current problems and to anticipate future problems of real-world environments. Adaptive intelligence thereby involves not only promoting one's own ability to survive and thrive in these environments, but also that of other individuals in one's own generation and in future generations [9,10]. Adaptive intelligence is not only individual but also collective, because promotion of species survival is always a collective enterprise [11,12]. Adaptive intelligence, then, is not a single thing—a "*g*" for adaptivity or some such—but rather a collection of diverse skills, attitudes, and behaviors putting the skills, attitudes, and behaviors into practice to achieve a common good. Others have also advocated for a broad rather than narrow view of intelligence [13,14], and have emphasized the importance of adaptation to the environment (e.g., [15–19]; see also Note 13).

The notion of adaptive intelligence lifts the concept of intelligence from a construct that is somehow "inside" the individual to one that is an interaction of a person or persons with a task with a particular set of contextualized situational constraints, from an individual construct to a collective as well as an individual one, and from one that is about achieving a likely short-term individual good to one that is about achieving a long-term common good (see Note 9).

Adaptive intelligence thus changes what it means to "act intelligently". For example, an individual might devise an industrial process that makes money for their employer and thus ultimately leads to a raise and promotion; they have, in the short term, acted, at an individual level, intelligently in their own interest. But if the process pollutes the

environment, then the result harms the environment, other people, and, ultimately, the common good, and so does not meet the current definition of being "adaptively intelligent".

As a second example, if corporate or governmental officials attempt to hide a case of sexual harassment and harass the victim to discourage future such complaints, they may, if the cover-up succeeds, have seemed to act intelligently in their own interest (i.e., preserving their corporate or governmental jobs); but they have harmed the common good by sending the message that harassment cases will be swept under the rug and victims persecuted; they thus have not acted adaptively intelligently, whatever their individual short-term benefits.

For a definition of intelligence to be rooted somehow in the interaction of biological processes with the environment, it must take into consideration what is biologically adaptive (see Note 16). If a species demonstrates elevated general intelligence but behaves in ways that degrade its ability to produce future generations that will survive and thrive in the environment, then what would it mean to refer to the members of that species, or to the species itself, as "intelligent"? Why would a species that destroys its own habitat view itself as "intelligent," or more fatuously, as supremely intelligent relative to other species?

Yet, that is exactly the situation that Homo sapiens—humans—now confront. Humans have so seriously degraded the environment that it is at least somewhat challenging to ascertain why they consider themselves intelligent, or even as at the top of the heap in comparison with other species in terms of intelligence [20]. But if we view intelligence not only as individual but also as collective (see Note 11), we must at least question whether our conception of "general intelligence" successfully accomplishes what it takes to promote the survival of our species (and allied species and species on which we depend, such as of fish and cattle, for example). Dinosaurs roamed the Earth for roughly 180 million years [21]. Human civilization as we know it today has been present on Earth for only 6000 years. How long will it last?

The problems we face in the world are numerous, perhaps innumerable—global climate change, pandemics, air pollution, water pollution, income disparities and general economic instability, unemployment, poverty, terrorism, increasingly autocratic governments, xenophobia, racism, crime, to name just a few (see further in discussion in [22,23]). These are only a few of the major problems the world faces. How did the world end up in such a mess if humans are so intelligent, or at least, think they are? Part of the reason is that the kinds of skills that general intelligence tests measure well do not necessarily transfer well to the real world, at least as it exists today.

At times, human intelligence has been defined, in part, in terms of transfer of training [24,25]. If there is one thing educational researchers know for sure, it is that transfer is difficult to attain, even when problems are superficially similar [26–30]. Imagine the situation, however, when not only problems, but also types of problems, are different in their deep structure as well as their superficial surface structure. Then educators rightfully could despair of the chances of getting meaningful transfer—or even of the people who are adept at solving one type of problem being adept at solving another type of problem.

Tests of general intelligence and tests that are proxy measures of general intelligence, such as the SAT, ACT, and GRE [31,32]—measuring general intelligence plus other more specific knowledge and skills—present problems with a particular set of characteristics. These problem characteristics, realistic though they may be with respect to problems presented in schools (which often teach to the tests), are not realistic with respect to the problems ordinary people of all ages face in adapting to the environment—they are not measures of adaptive intelligence. Table 1 shows 16 of the differences in the characteristics of problems typically used to measure general intelligence versus those that need to be used to measure adaptive intelligence.

Table 1. Sixteen Key Differences between General Intelligence (Standardized Test) Problems and Adaptive Intelligence Problems.

Difference	Issue	General Intelligence	Adaptive Intelligence
1	*Type of Answer Required*	Right vs. Wrong (sometimes with partial credit)	More Adaptive vs. Less Adaptive to the Environment
2	*Structure of Problem*	Well-structured: Clear, Well-defined Path to Unique Solution	Ill-structured: Multiple Ill-defined Paths to Solutions that Are Differentially Adaptive
3	*Emotional Arousal*	Low Emotional Arousal, Encouraging Clear Thinking	High Emotional Arousal, Discouraging Clear Thinking
4	*Stakes for Adaptation in Life*	Usually Low; Thus, Low Stakes if a Solution is Wrong	Often High; Thus High Stakes if a Solution is Wrong
5	*Contextualization with Regard to Everyday Life*	Largely Decontextualized Problems Weakly Related or Unrelated to Everyday Life Events	Highly Contextualized Problems Often Strongly Related to Everyday Life Events
6	*Need for Recognition of the Existence of the Problem*	None: Problems are Given by Standardized Test	Great: One Has to Figure Out for Oneself that the Problem Even Exists
7	*Need for Definition of the Problem, Once Recognized*	Low: Problems are Usually Partially or Completely Defined by Test	High: Problems are Poorly Defined or Not Seriously Defined at All
8	*Time Allowed for Solution*	Low: Problems Generally Must be Solved in a Few Seconds to, at Most, a Few Minutes	High: Problems Are Addressed Over Time and Often Unfold Over Time Rather than All at Once
9	*Need to Search for Information*	Low: Much or Most Information Needed for Solution is Presented in the Test Problem	High: Information Needed for Problem Solution Has to be Located in Available Reference Material
10	*Need to Evaluate Information for Relevance and Validity*	Information Given in Test Problem is Generally Viewed as Relevant and Valid	Information Sources Are Often Low in Relevance and Validity; Often They Are Mutually Contradictory
11	Role of Individual vs. Collective	Individual	Both Individual and Necessarily Collective
12	Motivation for Solution	Motivation (for Some) is to Receive a High Score on a Test	Motivation (for almost All) is to Resolve an Important Life Problem
13	Structural Complexity of Problems	Problems Tend to Be Structurally Rather Simple	Problems Tend to Be Structurally Quite Complex
14	Number of Steps to Solution	Problems Tend to Have Relatively Few Steps to Solution	Problems Tend to Have Many Steps to Solution
15	Intrinsic Interest of Problems	Tend to Be Relatively Boring	Tend to Be Relatively Engaging
16	Knowledge Needed to Solve Problems	Tends to Be Formal Knowledge of the Type Learned Inside of School	Tends to be Informal Knowledge of the Type Learned Outside of School

There is nothing particularly new in Table 1. Constructivists, going back at least to John Dewey [33,34], have made similar points about what is wrong with instruction and assessment. The message has been painfully slow to take hold—many of us are still waiting.

2. Adaptive Intelligence

The notion of adaptive intelligence, as noted above, harks back to the original definitions of the early twentieth century of intelligence as adaptive. Somehow, this conception of intelligence was too quickly cast aside in favor of a psychometric notion of general intelligence, as measured by intelligence tests. Indeed, today, much of the research on intelligence is based on Boring's notion of intelligence being whatever it is that intelligence

tests test [35]. But perhaps the operational definition of intelligence as being essentially what the tests test, with psychometric theories built around those tests [36], was a mistake. Maybe societies defined intelligence too narrowly.

Adaptation here refers to a broad rather than narrow form of adaptation. *Adaptation* in the narrow sense involves modifying oneself to fit the environment in which one finds oneself. Nature is not going to change in response to our whims. Often, we need to adapt ourselves to nature or to social forces beyond our control and change our behavior. But broad adaptation can also involve *shaping* the environment—changing the environment to fit us better. In other words, at times, the environment is nonoptimal, and we can find ways of modifying it so that it works better for us and perhaps for others. Finally, we sometimes can *select* a new environment when the environment in which we find ourselves is not working out. Adaptive intelligence involves a balance among, the narrow adaptation to, and the shaping and selection of environments. Adaptive intelligence comprises creative, analytical, practical, and wisdom-based knowledge and skills [37].

3. Elements of Adaptive Intelligence

Adaptively intelligent people have novel and compelling ideas (creative intelligence), ensure that the ideas are logically sound and coherent (analytical intelligence), can put the ideas into practice and at some level persuade others of their usefulness (practical intelligence), and try, through their ideas, to ensure some kind of common good (wisdom). Let us consider briefly each of those elements in turn. The COVID-19 pandemic has proved to be, for leaders, a test of adaptive intelligence.

4. Creative Skills and Attitudes

The first element of the theory of adaptive intelligence is a set of creative skills and attitudes. These skills and attitudes result in novel and compelling work that results from individuals or groups creating, designing, inventing, imagining, discovering, or innovating. The cornerstone of these skills and attitudes is based on a triangular theory of creativity [38]. According to this theory, being creative involves, above all, willingness to be defiant. There are three kinds of defiance.

The first kind is defiance of the self. This defiance means that an individual is willing to forego and go beyond their past beliefs, attitudes, and ideologies. They recognize that part of human growth is letting go of what they have believed, even strongly, before, and moving on to new beliefs, including new beliefs that are incompatible with or even contradictory to past beliefs. Some people are uncreative not because they lack the ability to think in new ways, but rather because they are not willing to let go of ways in which they have been socialized to think, and with which they are comfortable thinking.

The second kind is defiance of the crowd (see also [39]). Such defiance is willingness to go against what others believe and how others act. For many people, defying the crowd is very difficult because they believe that their status and perhaps their popularity depends on conformity. In general, people often go along to get along [40]. In one of the most famous psychology experiments of all time, Solomon Asch [41] discovered that people will go along with what others think, even if the people know that the others are clearly wrong. In another classic experiment, Stanley Milgram [42] found that most people show obedience to authority, even when they know that their obedience may be harming others. In general, people are socialized to conform [43]. Maybe, to some extent, they are hard-wired for it. But it is not a necessary feature of their behavior. People can choose to defy the crowd, at the same time that they realize that there often is a price for doing so in terms of their acceptance and popularity [44].

The third kind of defiance is defiance of the *Zeitgeist*, or predominant world view. Often, we are not even consciously aware of what this world view is, or of how we adhere to it. For example, most people paid little attention to the custom of shaking hands until COVID-19 made hand-shaking a maladaptive behavior. The difficulty in defying the Zeitgeist is that we have so many routinized patterns of behavior that we

do not even consciously recognize as forming part of our acceptance of the Zeitgeist. In the Age of Behaviorism, many psychologists and educators focused exclusively on behavior, discounting internal processes, because that is what they believed psychologists and educators do. Today, much the same might be said about the neuroscientific paradigm. Some funding agencies view this as the inexorable wave of the future, without considering that it is perhaps a scientific paradigm that, like all others before it, will come and go [45].

On this view, creativity is partly in one's ability to generate novel and compelling ideas, but also largely in one's willingness to do so in the face of opposition (see Note 38). Creative individuals need to be resilient when those invested in current paradigms critique or belittle their work. They also need to analyze their own work, as discussed next.

5. Analytical Skills and Attitudes

Analytical skills are involved when one analyzes, judges, organizes, critiques, evaluates, and compares and contrasts. In the theory of successful intelligence, critical mental processes—what have been called "metacomponents" or executive processes [46–49]—include recognition of the existence of a problem, definition of the problem, allocating resources to problem solution, mentally representing information, formulating a strategy solving the problem, monitoring problem solving, and evaluating problem solving after it is done.

Analysis has been a cornerstone of standardized tests of general intelligence and corresponds in part to what sometimes is called fluid intelligence [50–52]. Analytical intelligence is measured by problems such as number, letter or figural analogies, series, classifications, and matrices.

Analytical intelligence is what conventional tests of intelligence and related skills measure best. Yet, over the years, it has been found that, even when it comes to the analytical domain, the tests are domain-general in a way that does not always apply well to specific populations or specific domains. For example, what people mean by "intelligence" varies across time and place [53], and even between groups within a place [54]. For example, some ethnic groups place more emphasis on social skills, and others on cognitive skills, in their conceptions of intelligence [55].

In our recent work on scientific reasoning, we found that conventional standardized tests seem not to be particularly good measures even of the kind of domain-specific reasoning required for analyzing scientific theory and research [56–58]. Considering all these studies in combination, we found that tests of scientific reasoning skills, such as are involved in the formation of alternative scientific hypotheses, designing scientific experiments, and interpreting scientific data, are correlated with each other, but only weakly (and sometimes negatively) with tests of fluid intelligence, at least in the university samples we tested. In other words, scientific reasoning skills needed to design, interpret, and evaluate research hold together as a single factor, but are a different orthogonal factor from general intelligence. They will not necessarily be identified by conventional tests of general intelligence.

The studies cited immediately above on scientific reasoning (see 56–58) have a major limitation. They all were conducted on Cornell students, who will show a restriction of range in general intelligence. In all likelihood, with enough range, the scientific reasoning tests will correlate with general intelligence. Almost all complex cognitive measures do [59] (see also Notes 2–3). But the tests were designed for admission to graduate programs in the psychological sciences. Those applying to such programs generally will show restrictions of the range of general intelligence. So, for the population to which the tests are intended to generalize, there should be some restriction of range. What is not clear is what the exact amount should be.

The students taking the tests seemed to have trouble moving from theory to practice, as is discussed further next.

6. Practical Skills and Attitudes

Practical intelligence, or common sense, involves applying, using, implementing, putting into practice, and persuading [60,61] (see also [62] for a discussion of the related concept of social intelligence; [63] for a discussion of cultural intelligence; and [64] for a discussion of the related concept of emotional intelligence). Practical intelligence evolves from tacit knowledge—what one needs to know about matters of everyday life that, typically, no one teaches one and that often are not even verbalized. We have found that practical intelligence is only weakly correlated with general intelligence, and that it predicts important external criteria of success independent of general intelligence about as well as general intelligence does. Thus, if one uses both kinds of tests, one enhances prediction considerably. We have also found that practical intelligence is distinct from major personality traits, and that different kinds of practical intelligence within a domain tend to be moderately to highly correlated with each other (see Note 61).

7. Wisdom-Based Skills and Attitudes

According to a balance theory of wisdom [65], one is wise when one seeks a common good, by balancing one's own, others', and larger interests, over the long term as well as the short term, through the infusion of positive ethical values. Adaptively intelligent individuals need to be wise because they have to balance their own interests with the interests of other people, and even of people they do not like, as well as of members of other species. Wise people are not only good at balancing interests, but also at recognizing what they know at a given time, what they do not know at that time, what they can know at that time, and what they cannot know at that time. Wisdom is in many ways a synthesis of creative, analytical, and practical intelligence, as it generally involves generating novel and compelling, rational, and useful solutions to everyday problems, and then persuading others to buy into those solutions.

8. How Does One Teach and Test for Adaptive Intelligence?

Teaching and testing for adaptive intelligence can and should be integrated into school curricula. Previous work has shown both detailed strategies for teaching analytical, creative, practical, and wisdom-based skills [66–68] and that the teaching can result in significant improvements in achievement [69,70], but only if teachers are monitored to ensure that they do not fall back into teaching techniques that are more comfortable to them [71]. Here are some examples of how it can be done in five scholastic disciplines. Micro-level problems are at the interpersonal level, while macro-level problems take place at a broader level.

8.1. Language Arts

Micro. Tom Sawyer manipulated his friends into painting his fence by making it sound attractive to do fence painting. Was what he did ethically defensible? Why or why not?

Macro. What can we learn about how the world should handle COVID-19 or similar pandemics from Albert Camus's novel, *The Plague?*

8.2. Mathematics

Micro. How can math help us divide pieces of a pie evenly?

Macro. How can mathematics help us understand how diseases, including pandemics, are transmitted in a society?

8.3. Social Studies (Sciences)

Micro. Two friends who are fighting both want you to be on their side and not the other's side. What should you do?

Macro. What might our society do to reduce income inequality, which has grown very large in current times?

8.4. (Natural) Science

Micro. How do antibiotics help you and others get better when you or they have a bacterially caused illness?

Macro. What are some steps society can take to reduce global climate change?

8.5. Arts

Micro. How can music help you or others feeling emotional distress?

Macro. How did Picasso use the painting *Guernica* to make a statement against war?

When scoring for adaptive intelligence, one uses a set of prespecified criteria to evaluate responses [72,73]. These criteria follow the theoretical framework described earlier. For creative performance, one evaluates the quality of the work with regard to creating, designing, inventing, imagining, discovering, and innovating. For analytical performance, one evaluates the quality of the work with regard to analyzing, judging, organizing, critiquing, evaluating, and comparing and contrasting. For practical performance, one evaluates the quality of the work with regard to applying, using, implementing, putting into practice, and persuading. With regard to the ultimate wise and adaptive use of intelligence, one evaluates the extent to which a response helps to achieve a common good, by balancing one's own, others', and larger interests over the long- as well as the short-term, through the application of positive ethical principles. These evaluations are based on the processes of thinking, as people may experience legitimate differences in the products they see, for example, as "imaginative" or "useful". But it is worthwhile, I would argue, to perform subjective evaluations of more important criteria, and not just solely seemingly objective evaluations of less important criteria. That said, the scoring is only as good as the skills of those doing the evaluation, which is why it is important to train teachers and evaluators in the principles of the theory.

In our work, we have used a variety of problems in a variety of contexts to measure aspects of adaptive intelligence. Here is an example of a problem from work on scientific wisdom [74]:

"A scientific entrepreneur has developed a nutritional supplement that he believes offers great promise for helping people to lose weight. Because it is a supplement to be sold over the counter, it is not subject to FDA (Food and Drug Administration) approval. He has tested the nutritional supplement on 200 people, half of whom were randomly assigned to the supplement condition and half to a placebo condition. People of course did not know to which condition they were assigned. After 3 months in which members of each group took their respective daily pills, the experimental (supplement) group had lost an average of 21 pounds whereas the placebo group had lost an average of 1 pound. A venture-capital firm is considering offering the entrepreneur USD 5.5 million to start producing, marketing, and selling the product. You have been asked to advise the venture-capital firm as to whether to fund the production, marketing, and sales of the supplement. What would you want to ask and/or tell them?"

[Examples of] Possible Questions/Comments:

1. "Have potential side effects of the weight-reducing supplement been adequately studied, or studied at all?
2. Are there any undesirable consequences of using the drug, such as physical or psychological addiction?
3. For what population or populations is the supplement safe? Children, and if so, of what ages? Older people? People with weakened immune systems?

4. Does the supplement interact with pharmaceutical drugs, such that there might be unexpected side effects for people taking those drugs, including weight-loss drugs?
5. Maybe 3 months was not long enough to assess the supplement's effectiveness. The supplement's effect might decrease over time.
6. Can the supplement safely be used by people with unusual weight-related conditions, such as morbid obesity or anorexia (i.e., people taking the supplement to lose weight that they do not need to lose)?
7. Can the supplement be priced so that it is available to all who really would benefit from it, or will it "price out" many people who potentially could use it but who could not afford it?
8. Should this substance be sold over the counter?"
9. For how long can the supplement be used safely?
10. Will the supplement lead people to eat poorly, with their leaving it to the drug to achieve weight reduction?

9. Counterarguments

Consider counterarguments to the notion of adaptive intelligence. Permit me at least to address a few, although doubtless there are more.

9.1. General Intelligence Has a Large Set of Theoretical and Empirical Literature behind It. Adaptive Intelligence Does Not

This argument is indisputable. The purpose of this article is not to impugn the concept or importance of general intelligence. The literature provides a substantial foundation for the construct [75] (see also Notes 1–3). Rather, the purpose is to introduce a new concept, or perhaps, reintroduce an old one—the notion of intelligence as real-world adaptation. The field of intelligence has been focused on, some might say, infatuated with the *g* concept since 1904 [76]. Perhaps it is time, more than a century later, to think more broadly? Medicines were formulated at the turn of the century to cure various illnesses; some of them worked. But researchers did not stop looking for other solutions to medical issues, either to supplement or replace those medicines. Intelligence researchers might try doing something similar.

9.2. But Adaptive Intelligence Is Not a New Concept; Intelligence Has Been Viewed from the Start of Psychological Inquiry as the Ability to Adapt to the Environment

This point is also correct and fits with the argument here. Binet and Simon (1916) defined intelligence largely in terms of adaptation to the environment; so did the 1921 symposium on "Intelligence and Its Measurement" (see Note 5) as did the 1986 symposium (see Note 7). But the adaptational definition got lost somehow. Psychometricians largely have bought into Boring's operational definition (see Note 35), and many still do [77]. The result is that intelligence test scores have become as much a criterion as a predictor. They are seen as a kind of gold standard for what intelligence is. As a result, the field is locked into its century-plus-old conception, with the addition of hierarchical levels (see Notes 50, 52). These conceptions might benefit from some kind of augmentation, if those in the field would even consider it.

9.3. Adaptive Intelligence Is a Vague Concept

Adaptive intelligence is perhaps not much more, or no more vague, than *g*. After more than a century and thousands of publications, scholars still do not know what *g* is, at a psychological level. We may be a bit beyond Spearman's [78] concept of mental energy, but perhaps not so much. In a sense, though, adaptive intelligence is more clearly specified than other conceptions of intelligence: behavior that leads to the flourishing of humanity is adaptively intelligent, and behavior that is conducive to the ultimate degradation of the human and material environment so as to willfully reduce the quality of life or ultimate reproductive success of life for present or future generations, is lacking in adaptive intelligence. For example, not wearing a mask in times of COVID may not

reflect upon general intelligence, but it reflects negatively on adaptive intelligence because it willfully risks not only one's own health and wellbeing, but that of others, and may risk their lives as well [79].

It might seem that what is "adaptive" or "wise" can be determined only in retrospect—in effect, after it is too late. There are no doubt cases in which this is true. In so many cases, though, the results are predictable, but simply highly undesirable. For example, governmental and corporate cover-ups of sexual harassment (which have happened very recently), as mentioned earlier, and governmental and corporate pollution of air and water, are likely eventually to come to light, at least in today's world of the Internet and social media. The problem, I would argue, is not a lack of predictability, but rather the fervent wishful thinking that the cover-up should remain intact. Similarly, when Donald Trump, at least initially, denied the seriousness of the COVID-19 pandemic, or when Joseph Biden, Jr., abruptly pulled troops out of Afghanistan, numerous and diverse experts warned of the consequences. Afterward, there were the usual protestations that the outcomes were not predictable. Actually, the outcomes were predictable. The protagonists simply fervently wished that they would not happen. The problem was not predictability, but rather wishful thinking.

In much of life, outcomes are adaptively mixed. For example, gasoline- and diesel-powered automobiles pollute the air but transport people rapidly from one place to another; eating red meat may have negative effects on health (damage to the heart or increasing the risk of certain cancers), but also has positive effects (nutrients such as vitamin B-12 and iron). It is for this reason that, in scoring responses for adaptive intelligence, one evaluates processes of thinking rather than products. People often interpret the same evidence in different ways. At the same time, there are many instances in which the interpretations are rationalizations or wishful thinking, rather than analytically sound inferences.

Consider, for example, wearing a mask in the time of COVID-19. Ideologues have turned this into an alleged matter of "personal freedom". But is driving drunk a matter of personal freedom, or is physically abusing one's children a matter of "personal freedom"? If there are regulations against such acts, is the government imposing on people's personal freedom? Perhaps, but society, historically, has been comfortable drawing the line of personal freedom to forbid acts that, however much they may allow us to express ourselves, unnecessarily harm others. Acting in a way that one knows can seriously injure, sicken, or cause sickness or death in an innocent person does not promote an adaptive common good, no matter how it is rationalized.

9.4. We have Validated Measures of g but Not of Adaptive Intelligence

This point is also not disputed. Adaptive intelligence, as posed in this article, is a relatively new concept, first proposed in 2019 (see Note 9), although it is one that builds on the literature on intelligence as adaptation, going back to Piaget (see Note 19). Research on intelligence has not necessarily been well served by starting with tests and then producing theories based on them, rather than by following the more common scientific protocol of producing theories first and then building tests based on them. Perhaps there is some value in knowing what one measures before one starts measuring it.

9.5. Adaptive Intelligence Is Not a Single Construct but Rather Some Kind of Amalgamation of Constructs

This is true. But intelligence, at least as measured by intelligence tests, is also an amalgamation. Most intelligence tests, such as the Stanford-Binet and the Wechsler, yield subscores that amalgamate into a total score. Although some might view *g* as a pure construct, it is a hierarchically based construct amalgamated from subfactors at three or more levels. Where adaptive intelligence perhaps differs most from conventional constructions of intelligence is in being a collective as well as an individual construct (see Notes 11–12).

10. Conclusions

In conclusion, using adaptive intelligence as a framework for teaching helps place learning and teaching in a larger framework that is relevant to students' everyday lives, both at a micro level of interpersonal interactions and at a macro level of interactions in the world. It also places intelligence in a context relevant to adaptation in the broadest sense of helping humans and other species survive and thrive through perilous times. At this time, there is no comprehensive test of adaptive intelligence, although we are working on developing one. This is a project of many years' duration, with an uncertain future. But adaptive intelligence is not merely about testing. Most of all, adaptive intelligence places intelligence in the context for which the concept was invented—the broad adaptation to the environment that will ultimately be demanded of students to make their lives better and to make the world a better place.

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