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BEHAVIOURAL ECONOMICS AND THE COVID-INDUCED EDUCATION CRISIS

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Abstract

The COVID-19 pandemic hit many countries at a time when their education systems were facing multiple challenges. Economic, public-health and social impacts from the pandemic have exacerbated many of these challenges. The aim of this paper is to explore the way in which the behavioural sciences can help support the policy response to the COVID-induced education crisis, and to serve as a learning experience for other future crises. The paper involves an empirical exploration of the factors associated with a range of outcomes using large nationally representative datasets, and interpreting these relationships in the context of a detailed literature review. By using data that it is generally representative of the populations of interest, and is available for many dozens of countries with different histories, languages, cultures, and socioeconomic outcomes, this paper highlights how identifying behavioural biases can direct education systems towards more effective targeted policy interventions.

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1. The education crisis

At the start of 2020, prior to the emergence of the COVID-19 pandemic, there were a number of challenges facing the world's education systems. Some new, some emerging, and some more acute in particular countries than others. The evolution of labour markets, climate change, and the declining trust in institutions are some of them.

Prior to the pandemic the labour market was changing rapidly, with new jobs requiring new skills, and existing jobs under competition from machines and automation. It was never the case that robots would completely replace the majority or even a significant minority of workers any time soon (Autor, Mindell and Reynolds, 2020[1]). However, pandemic or not, the future of work will look very different to the pre-pandemic labour market, and unless the education system adapts, some workers will benefit substantially whereas others will be left behind and see their earnings eroded in relative and even absolute terms.

In Australia, where this paper was written, 2020 started with some of the most catastrophic bushfires ever witnessed in this country or anywhere in the world. Thirty-four people lost their lives and almost eight out of ten (78.6%) Australians 'were impacted either directly, through their family/friends, or through the physical effects of smoke … [and] around 2.9 million adult Australians had their property damaged, their property threatened, or had to be evacuated' (Biddle and Reddy, 2019[2]). The bushfires (also known as the Black Summer fires) affected air quality in New Zealand and South America[1] and released 430 tonnes of carbon dioxide into the atmosphere (Jalaludin et al., 2020[3]). Estimates using satellite imagery found that 30.4 million hectares burnt, along with almost one-fifth of Australia's eucalyptus forest coverage— 'a figure more than 7.5 times higher than the annual average percentage burnt for the past 18 years' (Bowman et al., 2020[4]). The bushfires disrupted learning in Australia, with many schools needing to be closed due to smoke or direct fire risk, and some schools experienced direct physical damage (though fortunately the worst of the fires occurred during the summer recess).

The bushfires in Australia are but one of many examples of the early impacts of climate change, that are only going to become more common and more severe into the future. Therefore, in addition to the direct impact of climate change on education delivery, education systems need to adapt their instruction to educate and prepare students about the role climate change will have on their lives, as well as provide the training and inspiration for students to help solve the wicked problems of the future caused by anthropogenic climate change (Monroe et al., 2019[5]).

An additional challenge facing education systems is the continued decline (up until early 2020) in trust in institutions. Although declines have been inconsistent across countries (trust has declined by more in some countries compared to others) or through time (trust can improve temporarily due to positive interventions by governments), there is consistent international evidence that individuals had been becoming less trusting of their government, or institutions that are closely associated with government (Simon, 2020[6]); (Wang and Gordon, 2011[7]). While education institutions remain more trusted than many others (Biddle and Reddy, 2019[2]), general erosions in trust are still impacting on the education (Carvalho and de Oliveira Mota, 2010[8]) and scientific (Achterberg, De Koster and Van der Waal, 2014[9]) systems. This makes it harder for individual institutions to

[1] https://www.bbc.com/news/world-australia-51101049

maintain a positive relationship with other stakeholders including students, the general community and the government.

Another of the impacts of declining trust in institutions is an erosion in the tax base that funds education institutions in a range of countries. The increase in profit shifting by multinational organisations, difficulty in taxing new aspects of the economic system and in particular the digital economy, and ongoing tax avoidance and evasion particularly amongst high wealth individuals, are making increasingly difficult for governments to maintain an adequate revenue base for the delivery of education (Alvarez-Martinez et al., 2018[10]). This 'tax gap' (Gemmel and Hasseldine, 2012[11]) is particularly challenging for small open economies who have less bargaining power than many of the world's largest firms or richest individuals.

These challenges do not act in isolation and are only indicative of the many issues that need to be considered in governments' efforts to build more resilient education systems. Furthermore, as well as the ongoing effect of poverty and deprivation on learning, these challenges are likely to have played a role in the exacerbated variation within and between countries in education performance at the start of 2020, as identified by national data in many education systems (OECD, 2020[12]).

1.1. The impact of COVID-19 on education systems

There is never an ideal time for a global pandemic, but as briefly explained previously, many education systems were particularly vulnerable at the start of 2020.

At the time of writing this paper, there had been around 1.5 million deaths worldwide that were directly caused by COVID-19 and more than 65 million confirmed cases. These are likely to be an under-estimate, as there is consistent evidence across a number of countries that, especially early in the pandemic period, deaths attributed to COVID were lower than the excess deaths in 2020 above historic trends (Woolf et al., 2020[13]).

Not all countries and economies have been impacted in the same way by the pandemic. In Western Europe and North America, regions with developed health systems and reasonably reliable reporting, there are many countries with more than 800 deaths per 1 million residents (for example Spain, the United Kingdom, France, Italy and the United States). In other countries in these regions (for example Canada and Germany), per capita deaths per million are less than half of that experienced by the most impacted countries. Even more dramatically, there are many developed countries in East Asia and the Pacific (for example Australia, New Zealand, South Korea, Taiwan, and Japan) with less than 50 deaths per 1 million residents.

Economies have also been impacted, with many countries reporting their largest and sharpest decreases in employment and income since at least the Great Depression in the 1930s (McKibbin and Fernando, 2020[14]); (Baker et al., 2020[15]). Even in these countries that have been spared the worst infection and mortality rates, the economic and social shocks have been large. In Volume 2 of the OECD's 2020 Economic Outlook, it is estimated that world economic output declined by 4.2 % in 2020, with unemployment increasing from 5.4 % in 2019 to 7.2 % in 2020[2].

Looking in more detail at one particular country that the author has been involved in researching, in Australia, with a mortality rate of 35.6 deaths per million residents and an infection rate of 1,095.7 per million residents, Biddle et al. (2020[16]) estimates that the lost

[2]https://www.oecd-ilibrary.org/economics/oecd-economic-outlook/volume-2020/issue-2_39a88ab1-en

income per household was $4 726 (USD 3 511) over the 40 weeks from March to the end of November. Even more dramatically, Biddle et al. (2020[16]) estimate that the income equivalent well-being cost of the pandemic is equal to $16,905 (USD 12 559) per adult in Australia over the same period.

An exogenous shock of this scale could not have had anything but a large effect on all aspects of society, including education delivery. This includes, but is not limited to, the very rapid and in many ways unprecedented shut down in face-to-face learning that occurred in most countries during the first wave of infections, and has continued to different degrees in many (though not all) countries throughout 2020 as infection rates fluctuate.

In Schleicher (OECD, 2020[17]), a range of other specific impacts of the COVID-19 pandemic on education systems were identified. These were based on detailed analysis of data from prior to the pandemic, as summarised in (OECD, 2020[18]), as well as initial data from education systems provided directly to the OECD. These impacts can be summarised across six key areas, as outlined below:

1.1.1. Public financing of education

Global economic output has been and will continue to be impacted by the pandemic and this is likely to impact on the funds available to education systems. Not only are tax receipts down, but government budgets have had to be diverted to a range of public health expenditures (directly and indirectly related to care for those infected by COVID-19) as well as economic stimulus and support. In addition to a loss of government funding, education systems are likely to have lost private funding as students and their families have either lost income or have had to redirect expenditure.

1.1.2. International student mobility

Many students have had to return to their home country or have been restricted from travelling to their education destination. This has impacted on education systems which have either lost revenue or have had to provide additional support with significant costs. In addition though, students who have been able to continue their studies are likely to have had a less than ideal learning experience, missed out on exposure to the broader social and economic life of their destination country, and have been unable to gain work experience to supplement their learning.

1.1.3. Loss of instructional time delivered

To varying degrees, all education systems had experienced some closures, which led to an overall reduction in instructional time, and in particular a reduction in instructional time in a face-to-face setting. For some students, this loss of instructional time has had minimal impact as they have been able to supplement their learning through other means. For other students though and in particular those students from a relatively disadvantaged background, such support has been much harder to obtain, and educational gaps are likely to have widened.

1.1.4. Variation in quality of measures to continue students' learning during closures

Countries and school systems have used a variety of remote learning resources to make up for the loss in face-to-face instruction. For some education providers, particularly those that have had a long history of providing education online, the transitions have had minimal impact. However, other systems have found it more difficult either due to a shorter history of online provision, more difficult subject matter, or resource constraints. Furthermore, students have varied in the access they had to these resources based on their socioeconomic position or geographic location.

1.1.5. Teachers' and educators' preparedness to support digital learning

Teachers and educators have needed to adapt quickly to a changing pedagogical approach to learning, with not all teachers having the resources required to do so, and many teachers not having the required skills and experience to make use of the resources that were available.

1.1.6. Subject-specific constraints

Many upper-secondary and tertiary students combined work and school-based instruction, which was made difficult or impossible by social distancing and the lockdown of facilities. Furthermore, subject areas like creative arts, clinical practice, and lab-based instruction has been more difficult to transition to online learning.

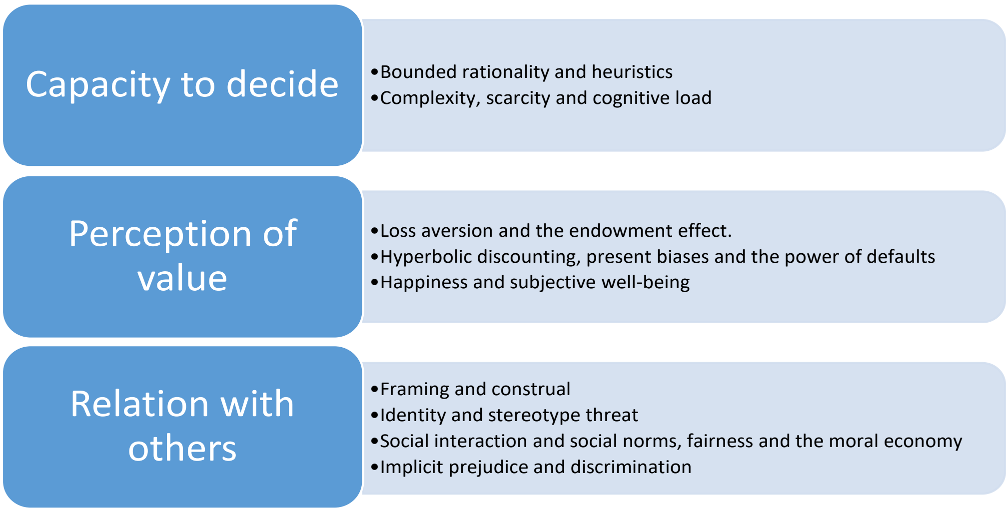
1.2. The role of behavioural insights in responding to the education crisis

Missing from the summary of impacts of the COVID-19 pandemic on education institutions articulated by the OECD (2020[18]) is the behavioural responses of students, their families, and education providers. A reflection through this lens can be of great value for governments, in order to increase the capacity of success of policy measures put in place or continued as countries navigate away from the pandemic. This type of reflection will also be all the more useful in contexts where economic resources are under greater public scrutiny, or having to meet a larger array of competing demands. Currently, implicit in much of the discussion and some of the policy responses is that individuals within the education system will respond to this and other crises as *Homo Economicus*, or the rational agent.

According to Koh (2012[19]), this species is made up of 'self-interested, rational agents: they analyse the costs and benefits of various options and choose the option that maximises their utility. They have stable, consistent preferences and the options they face are comparable to one another.' He or she, has tended to be the target of many of our education policies either implicitly or explicitly. This is good, because *Homo Economicus* is very easy to design policies around. This species is a useful starting point for designing policy and it has given us some useful ongoing pointers on people's behaviour. It is much better and more useful than just assuming that people make decisions randomly or on a whim.

Research is increasingly showing, however, that the above description of self-interested agents with stable preferences does not apply very well to *Homo Sapiens*. Rather, the species that we know is neither completely rational, nor completely random in its decisions. Rather, *Homo Sapiens* exhibit predictable biases that make it less likely that they will achieve their own stated desires. This can complicate the design and efficiency of policy broadly and education policy in particular. But the details of these biases can be used to better design policy. Key insights to be discussed in this paper can be grouped into three strands, which are also presented in Figure 1.

Figure 1. Key behavioural insights selected for analysis, by strand of action



1.2.1. Capacity to decide

To the author of this paper, the most valuable insight relates to **bounded rationality and heuristics**. In essence, we do not make the perfect decision, but a good enough decision. This is exacerbated by issues of **complexity, scarcity and cognitive load**, whereby poverty increases the cost of bad decisions and makes them more likely.

1.2.2. Perception of value

Loss aversion and the endowment effect relate to the consistent finding that we care more about what we lose than what we gain. And we care about when those losses and gains occur. **Hyperbolic discounting** reminds us that we care about the present over the future, a lot. And the literature on **subjective well-being** suggests that, yes money buys happiness, but happiness becomes more expensive the more money you have.

1.2.3. Relation with others

One of the sets of behavioural insights that we really should be much more aware of in the social policy domain relates to **framing and construal**. We make decisions based on how the world appears, not how it is. And this includes how we think about ourselves. There is a large body of research around **identity, social norms and fairness** that shows that we care about how we see ourselves and how others see us, and we care about how much others have, not just how much we have. Finally, with regards to **implicit prejudice and discrimination** the evidence unfortunately shows that most of us are racist/sexist, we just do not know it or care to admit it.

1.3. Universality of behavioural insights

Alongside the critique of the realism of the standard neoclassical model of human decision making (*Homo Economicus*) has been a growing recognition that many of the psychological theories that the fields of behavioural economics/sciences have drawn upon may not be generalisable beyond the societies within which they are developed. A key proponent of this view has been Joseph Henrich, who coined the acronym WEIRD, to refer to those who come from societies that are Western, Educated, Industrialised, Rich and Democratic. It is argued by Henrich and co-authors (Henrich, 2020[20]) that many of our psychological (and other) theories have been built on studies of such 'WEIRD' populations and, even if they are highly robust and rigorous in their development, cannot be extended to other population groups.

Importantly, some of the biases outlined above (and in more detail below) appear to be more prevalent in WEIRD countries, whereas others appear to be less prevalent. In analysing data used later in this paper, Falk et al. (2018[21]) showed that '(i) preferences exhibit large heterogeneity across and within countries, (ii) this variation is at least partly systematic and linked to both individual-level characteristics and aggregate cultural or biogeographic endowments, and (iii) the survey measures of preferences appear to capture heterogeneity that is relevant for explaining outcomes.'

The specific field of behavioural economics has had notable contributions with regards to the universality of many of the biases outlined above and below. While in general they tend to hold across countries, cultures and settings, they can vary quite substantially in their extent and their importance. A reasonably early example of this was Levinson and Peng (2007[22]) who 'conducted an empirical study in the United States and China to examine how cultural background informs economic decision-making and to test whether framing, morality, and out-group information affects judgements of financial value and property ownership across cultures.' They found, for example, that 'framing effects affected both American and Chinese participants, but in different ways.'

1.4. Remainder of this paper

The aim of this paper is to explore the way in which behavioural economics specifically and the behavioural sciences more broadly can help support the policy response to the COVID-induced education crisis, and also to serve as a learning experience for other future crises. The paper involves an empirical exploration of the factors associated with a range of outcomes (including outcomes that have been the focus of the behavioural sciences), using large nationally representative datasets, and interpreting these relationships in the context of a detailed literature review. The analysis includes a mix of descriptive and regression-style analysis, with analysis carried out using a mix of individual, school, and country-level data.

The remainder of the paper is structured as follows. Section 2 outlines in more detail the research and evidence supporting the behavioural insights introduced above. Section 3 provides a summary of how the behavioural sciences have been applied to both education policy (3.1) and the COVID-19 pandemic (3.2). This is followed by new analysis of existing datasets in Section 4 that draws out some of the implications from the behavioural sciences using observational data. Finally, Section 5 provides some concluding comments and recommendations for policy interventions and evaluations that leverage the insights and the data analysis provided in the remainder of the paper.

2. Behavioural insights and education policy: The emerging science

There is a stereotype of the person characterised by most economic models of human behaviour that has variously been referred to as the *Rational Agent*, *Homo Economicus* or *Economic Man* (Persky, 1995[23]). While John Stuart Mill did not coin the term (it was in fact used originally as a criticism of his abstraction), the description in Mill (1836[24]) as cited by Persky (1995[23]) is still quite relevant. According to Mill, the discipline of economics (then political economy) 'does not treat of the whole of man's nature as modified by the social state, nor of the whole conduct of man in society. It is concerned with him solely as a being who desires to possess wealth, and who is capable of judging the comparative efficacy of means for obtaining that end.'

Economics is not the only discipline that has built theories of behaviour around such assumptions with Homans (1961[25]), Coleman (1994[26]), and Goldthorpe (1998[27]), just a few of the sociologists who have developed models around rational choice theory, exchange theory or rational action theory. Rational choice theory has also been important in political science, especially in the development of theoretical models (Levi, 2009[28]). For whatever reason though, it is the discipline of economics that has contributed most to rationality as a basis for policy development. This might be because, as Daniel Kahneman (2013[29]) notes in the foreword to Shafir (2013[30]): "Like it or not, it is a fact of life that economics is the only social science that is generally recognised as relevant and useful by policy makers.''

Like with many caricatures, the supposed reliance on *Homo Economicus* in the discipline of economics has an element of truth. However, from the start it was recognised that humans were more complicated than the standard model would suggest (including by Mill himself) with Sen (1977[31]) noting quite strongly that 'The *purely* economic man is indeed close to being a social moron' [italics in original]. It would be fair to say that most economists have recognised the simplified nature of the assumptions of rationality, but have felt that it was a useful approximation or starting point from which to build more detailed models. These models were assumed to be close enough to be able to usefully predict human behaviour in various circumstances and that as long as people varied from it randomly then there should not be any biases in the model predictions.

Given the central role of economics in public policy debate (justified or otherwise), it is probably not surprising that it is from within that discipline that the critique of *Homo Economicus* has gained the most policy traction. This is despite the fact that other social sciences like psychology, sociology and anthropology have long noted the limitations of assumptions of rationality. In what would become to be known as behavioural (or behavioral[3]) economics, a growing body of research is questioning not just the realism of *Homo Economicus*, but also the utility.

According to Camerer and Loewenstein (2004[32]) "At the core of behavioral economics is the conviction that increasing the realism of the psychological underpinnings of economic analysis will improve economics on its own terms --generating theoretical insights, making better predictions of field phenomena, and suggesting better policy.'' There is of course a danger that the more complex the economic models become, the less tractable they are for giving clear predictions to guide policy decisions. In essence, it is worth keeping in mind

[3] In this paper, we use the UK/Australian spelling of behavioural, apart from when contained in a direct quote.

the quote attributed to Box and Draper (1987[33]) that "Essentially, all models are wrong, but some are useful.''

Camerer and Loewenstein (2004[32]) also point out in their chapter that a number of authors of the 18th, 19th and early 20th centuries that are currently treated as economists wrote extensively on psychology. These include Adam Smith, Jeremy Bentham, Francis Edgeworth, Irving Fisher, Vilfredo Pareto and John Maynard Keynes. Despite this long history, behavioural economics as a separate field within economics can probably be traced to the work of two psychologists in the 1970s – Amos Tversky and Daniel Kahneman. Their (1974[34]) paper on judgement under uncertainty and their (1979[35]) article on Prospect Theory are not only two of the most cited articles in behavioural economics, but also in the more mainstream journals that they were published in (*Science* and *Econometrica* respectively).

Together with authors like Matthew Rabin, Colin Camerer, George Loewenstein, Dan Ariely and many others, the theoretical insights from Tversky and Kahneman enriched the understanding of human behaviour as it related to economic and other domains. However, the field of behavioural economics gained a much greater public prominence in 2008 with the publication by Richard Thaler and Cass Sunstein of *Nudge: Improving Decisions on Health, Wealth and Happiness* (2008[36]). Some of the key insights that were covered in *Nudge* and will be expanded on below are the importance of bounded rationality, loss aversion, framing and hyperbolic discounting. Importantly, *Nudge* also spelled out some of the policy implications of the research and led to the creation of the *Behavioural Insights Team* within the UK Government[4] and the appointment of Cass Sunstein as the Administrator of the White House Office of Information and Regulatory Affairs.

In the remainder of this section, we discuss in more detail the nine key differences between *Homo Economicus* and *Homo Sapiens* outlined in the previous section, using the three higher level groupings of Capacity to decide (2.1); Perception of value (2.2); and Relation with others (2.3). There are five of these differences that are strongly associated with the field of behavioural economics – bounded rationality and heuristics; loss aversion and the endowment effect; complexity, scarcity and cognitive load; framing and construal; and, finally, hyperbolic discounting, present biases and the power of defaults. While not always considered within the field of behavioural economics, there are a number of other areas of research from what broadly might be defined as the applied behavioural sciences that have policy relevance. Four that will be expanded below are happiness and subjective well-being; identity and stereotype threat; social interaction, fairness and the moral economy; and implicit prejudice and discrimination. We begin though with one of the earliest challenges to the standard economic model.

2.1. Capacity to decide

2.1.1. Bounded rationality and heuristics

It would be very hard work to be *Homo Economicus*, having to calculate and evaluate the costs and benefits of every decision from the smallest (should I buy the coffee or the tea?) to the largest (should I buy that house, have an additional child, send that child to a preschool or invest in that law degree I have always wanted?). *Homo Sapiens*, on the other hand, tend to take short-cuts and put limits on the effort that they will go to act rationally. This is the insight from Herbert Simon, a psychologist who won a Nobel Prize in Economics in 1978 for his work on the concept of bounded rationality (Simon, 1955[37]).

[4] https://www.gov.uk/government/organisations/behavioural-insights-team

According to Koh (2012[19]), Simon has argued in a number of papers that “the theory of rational choice placed unrealistically high cognitive demands on people’’ and that people instead made choices based on satisficing or where individuals “generated an aspiration of the kind of solution they were looking for, searched for it one solution at a time, and stopped searching once they had found something acceptably close to their aspiration.’’

Kahneman (2011[38]) developed this idea further in his book *Thinking Fast and Slow* through the concept of heuristics or simple rules that individuals use to make complicated decisions more manageable. An example of such a heuristic is mental accounting (Thaler, 1999[39]) where rather than treating all financial decisions together, individuals assign expenditures to different categories or mental accounts like food, clothing, entertainment, mortgage payments, etc. Costs and benefits are then analysed within each category rather than globally. While this reduces cognitive load, it can lead to inefficient decisions, for example by making decisions differently for savings accounts, investments accounts and cash (when in practice all money is fungible).

Kahneman (2011[38]) uses the concept of System 1 (rapid, easy decision making) and System 2 (slow, deliberate decision making) to consider under what circumstances people will behave in ways that approximate the rational decision maker and under what circumstances people will exhibit known biases. According to a number of experiments presented in the book, the latter is most likely to occur under times of stress and high cognitive load.

2.1.2. Complexity, scarcity and cognitive load

An emerging finding from experimental and other research is the profound negative effects on cognitive ability from the ongoing stresses of poverty. In a recent review of Mani, Mullainathan et al. (2013[40]), Matthew Yglesias, the then Economics and Business correspondent of the online newspaper *Slate* concluded that ‘Bad Decisions Don’tn’t Make You Poor. Being Poor Makes for Bad Decisions.’ This conclusion was based on two experiments. One, in the United States, where invoking financial imperatives was shown to negatively impact on test scores for those with low income but not those with high income. The second experiment was conducted in India and showed that sugar-cane farmers performed better on a similar test after the harvest rather than before. The authors argued that because sugar-cane is a cash crop, the difference cannot be explained by improvements in nutrition. But, rather, by reductions in financial uncertainty and stress.

In a review of the article in the same issue of *Science*, Vohs (2013[41]) attributed these findings to the ‘limited-resource model of self-control.’ Under this model, individuals have a finite amount of self-control. This self-control is a resource that can be used to undertake costly behaviour that leads to long-term benefits (like education or savings) or to avoid pleasurable behaviour that leads to long-term costs (like alcohol consumption or risky behaviour). Those with few financial resources are required to exercise this self-control on a much more frequent basis than those who are relatively well off. On a day-to-day level, they must plan meals ahead of time rather than purchasing expensive home delivery. They must save for large purchases rather than paying for them up-front. These and many other examples mean that when it comes to making other decisions that require self-control, they have depleted more of their resources than those who are able to make financial decisions with less stress and worry. In essence: ‘Because the poor must overcome more urges and make difficult decisions more often than others, they are more likely to over-eat, overspend and enact more problematic behaviours’ (Vohs, 2013[41]).

This view is encapsulated by the following quote from Sendhil Mullainathan and Eldar Shafir (2013[42]), who were also co-authors of the *Science* article:

> *… the behavioral patterns of the poor may be neither perfectly calculating nor especially deviant. Rather, the poor may exhibit fundamental attitudes and natural proclivities, including weaknesses and biases, that are similar to those of people from other walks of life. One important difference, however, is that in poverty there are narrow margins for error, so that the same behaviours often manifest themselves in more pronounced ways and can lead to worse outcomes. (p. 419[42])*

As argued by Mullainathan and Shafir in *Scarcity*, their (2013[43]) book length treatment on the subject, poverty and social deprivation is a situation of high stress and cognitive load with much less ‘slack’ in the life of the poor. While there is some evidence that lower levels of education and financial literacy impact on the decisions of the poor, it is also likely that anyone who is faced with such circumstances is likely to make what might appear from the outside (and to policy makers) to be irrational decisions. However, the point made by the authors is that everyone suffers from such biases, it is the consequences that are so much worse for people in poverty.

2.2. Perception of value

2.2.1. Loss aversion and the endowment effect

As noted in Camerer and Loewenstein (2004[32]), the concept of loss aversion has been noted at least as far back as Adam Smith’s *Theory of Moral Sentiments*, first published in 1759 but taken here from the 2010 ([44]) edition, where he stated that ‘we suffer more … when we fall from a better to a worse situation than we ever enjoy when we rise from a worse to a better.’ More specifically, loss aversion refers to an individual’s preference for avoiding losses over receiving gains of a similar (or even smaller) amount. Related to this is the concept of the endowment effect where people value things that they already own or have possession of over similar goods that they do not.

Both behavioural biases have been demonstrated experimentally in Kahneman, Knetsch et al. (1990[45]) with undergraduate students valuing mugs or chocolates by about twice as much if they were in their possession than if they were required to purchase them. In a slightly less experimental setting (albeit still based on college students), Ariely (2008[46]) summarised a study that showed that students were willing to pay $170 on average for particular basketball tickets if they did not already have them, but demanded $2,400 for them (on average) if through random chance the tickets were in the person’s possession.

One of the policy implications of loss aversion and the endowment effect is that there may be a divergence between a person’s willingness to pay (WTP) for a good and the willingness to accept (WTA) payment, which can impact on the valuation of public goods. This may mean that people are more likely to accept policies with smaller gains but no one being made worse off than those which result in larger gains and losses for a small minority of people.

At an individual level, a person’s actions will be influenced by whether an event is interpreted as a potential loss, or a foregone potential gain. Loss aversion might also lead to different investments in things like education depending on what the baseline assumption or default is. Consider two individuals with exactly the same level of academic ability and future job prospects. Standard human capital theory would assume that they weigh up the costs and benefits of studying while taking into account the probability of success. If the first of these individuals is from a background that expects the completion of a degree, then not commencing a course of study or dropping out part way through is considered a loss. The second individual who comes from a background with lower expectations who does not go to university or who drops out is simply foregoing a potential gain. As losses have been shown to have a greater effect on behaviour than gains, this might partly explain why those from low expectations backgrounds under-invest in education relative to those from high expectations backgrounds.

2.2.2. Hyperbolic discounting, present biases and the power of defaults

It has long been recognised that individuals value consumption or leisure in the current period higher than they do in future periods. In essence, when people construct a lifetime utility function, they discount the future. This decreases the willingness people have to undertake activities like education or financial savings which have up-front costs but long-term benefits but increases the willingness of people to engage in behaviour that has short-term benefits but long-term costs (like smoking, alcohol consumption or risky sexual behaviour).

The standard assumption that has been used since Paul Samuelson's (1937[47]) formulation is that individuals exhibit time-consistent discounting which can be approximated by an exponential discounting function. That is, the discount between day x and day x+1 is consistent regardless of whether day x is today, 30 days into the future or 10 years into the future. Such consistency has not, however, been supported by empirical data. Rather, individuals are very impatient over the short-term but very patient over the long term. This is known as hyperbolic discounting and, as discussed in Frederick, Loewenstein et al. (2002[48]) explains why "someone may prefer USD $110 in 31 days over USD $100 in 30 days, but also prefer USD 100 now over USD 110 tomorrow.'' (p. 361[48])

The implication for decision making is that even very small up-front costs can have large implications for people's long-term outcomes. This partially explains the power of default options, or the option that will hold if no action is taken. Standard models assume that the default option amongst many should have only a negligible impact on people's choices. However, in reality the small physical cost of having to tick a separate box on a form, alongside the somewhat larger mental cost of having to figure out which is the best option can lead people to remaining in a programme or stream which is not in their own stated long-term interests (Thaler and Sunstein, 2008[36]). This heavy discounting of the present is reinforced by loss aversion with the default option being seen as even more attractive given the potential gain of choosing a different option is far outweighed by the potential loss from actively choosing the wrong option.

2.2.3. Happiness and subjective well-being

From a reluctance to engage with subjective data, there has been an increasing interest from within the field of economics towards the analysis of subjective well-being. Revolution may be an exaggeration, but this is how it has been described in Bruno Frey's (2008[49]) *Happiness: A Revolution in Economics*. Like with many recent advances in the behavioural sciences though, the notion of designing policy around happiness and subjective well-being has a long but sometimes ignored history. For example, Bok (2010[50]) notes that 18th/19th Century British philosopher and social reformer Jeremy Bentham 'gained enduring fame through his pronouncement that the overriding aim of government should be to secure the greatest happiness of the greatest number of people by maximising pleasures and minimizing pain.'

It tends to be recognised that there are two measures of subjective well-being – emotional well-being and life evaluation, although there is also a third one, known as eudaimonia. According to Kahneman and Deaton (2010[51]) "Emotional well-being refers to the emotional quality of an individual's everyday experience—the frequency and intensity of experiences of joy, stress, sadness, anger and affection that make one's life pleasant or unpleasant.'' Kahneman and Krueger (2006[52]) define the similar concept of experienced utility as 'a continuous hedonic flow of pleasure or pain'. Diener (1994[53]) also talks about two distinctive components of subjective well-being but instead labels the first as the affective part or 'the pleasantness experienced in feelings, emotions and moods'. Generally speaking, at each particular point in time, an individual experiences a certain level of pleasure or pain, positive and negative utility, or positive and negative affect. When summed over a day, year or lifetime, this gives a measure of experienced or emotional well-being which can then be compared across individuals or compared within individuals at different points in time.

The second type of well-being usually discussed in the literature is life satisfaction or life evaluation. According to Kahneman and Deaton (2010[51]), life evaluation 'refers to the thoughts that people have about their life when they think about it'. Diener (1994[53]) refers to this aspect of well-being as the cognitive part, or the extent to which a person's life measures up to their expectations. A third concept of well-being that is related to, but slightly different from, life evaluation is *eudaimonia* (also referred to as eudaimonic well-being, eudaemonia or eudemonia) which, according to Fredrickson, Grewen et al. (2013[54]) "results from striving toward meaning and a noble purpose beyond simple self-gratification.'' Such a concept was used heavily by Ancient Greek philosophers (especially Aristotle) and although sometimes translated to mean happiness, can better be thought as flourishing or one's life having meaning.

Very few economists would have denied that emotional well-being, life evaluation or *eudaimonia* are important. However, in many behavioural models and empirical research a person's income or the income of their family has been used as a proxy for subjective well-being. There is some empirical support for this as those countries or individuals with higher income tend to report higher levels of well-being (Clark, Frijters and Shields, 2008[55]), (Kahneman and Deaton, 2010[51]). However, there are three reasons why income (or consumption/expenditure) is not a completely satisfactory substitute for more detailed measures of well-being.

First, although the relationship is positive, it is non-linear. Higher levels of income lead to higher levels of happiness or other measures of well-being, but only up to a point for certain measures of well-being. Kahneman and Deaton (2010[51]) show that in the US 'the effects of income on the emotional dimension of well-being satiate fully at an annual income of $75,000'. In the same article, the authors showed that even with measures of well-being that do not appear to satiate (for example life evaluation), there are diminishing returns, with a greater absolute increase in income required for the same increase in well-being at the upper end of the distribution. There is also a positive association between income and subjective well-being at the national level, with increases in income associated with diminishing but still positive increases in well-being (Stevenson and Wolfers, 2013[56])

The second reason for not using income as a substitute for well-being is that the distribution of income matters. Income matters for well-being not just because of what it allows one to consume, but also for the way it positions a person in society or, according to Clark, Frijters et al. (2008[55]) "higher income brings both consumption and status benefits to an individual.'' Importantly, "comparisons can either be to others or to oneself in the past.'' The third main limitation of income is that it matters how that income is generated. At a national or societal level, increases in income that come at the cost of considerable environmental degradation will probably not lead to increases in well-being. At an individual level, increases in income that come at the expense of additional commuting time or at the expense of social relationships may have a similar zero or even negative effect on well-being (Kahneman and Krueger, 2006[52]). Taking these three limitations together, government policy that solely aims to improve income or some other measure of socioeconomic status, or a policy that is evaluated using socioeconomic status as a proxy, may not lead to sustained improvements in well-being and may even have unintended negative consequences. This is true for nations as a whole, as well as for particular population subgroups.

2.3. Relation to others

2.3.1. Framing and construal

Standard theory of rational agents assumes that they make choices based on the world as it is. However, the weight of empirical evidence suggests that more realistically, the way circumstances are construed matters. According to Mullainathan and Shafir (2013[43]) again, "Behaviour is directed not toward actual states of the world, but rather toward our mental representation of those states, and mental representations do not always bear a one-to-one relationship to the thing they represent, nor do they necessarily constitute faithful renditions of actual circumstances.''

In other words, framing matters. This was demonstrated quite vividly in the so-called 'Asian-disease' experiment presented in Tversky and Kahneman (1979[35]). In this experiment, two groups of individuals were asked about the best policy response to a hypothetical 'Asian-disease' which, in the absence of any intervention, will kill 600 people. The first group were given the option of Programme A – saving 200 people with 100% probability and Programme B – a one-third probability that 600 people will be saved and a two-thirds probability that no one will be saved. The second group of individuals were given the choice between Programme C – 400 people will die (with 100% probability) and Programme D – a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

It is reasonably straightforward to show that Programme A is exactly equivalent to Programme C and Programme B is exactly equivalent to Programme D. However, in the first method of framing, the majority chose Programme A, the least risky option. In the second method though, the majority chose Programme D, the most risky. It might be an extreme example (using terms like 'people will be saved' and 'or will die'), but the implications are quite broad. Programmes that are potentially risky are more likely to be acceptable to the voting public (and potentially those who are targeted by the intervention) if they are framed around avoiding losses.

A further finding from the literature is that the history, context and nature of the relationship between the state and individuals involved or targeted by an intervention matter. Interventions that are otherwise well-intentioned or might be well received in a context where relationships between individuals and service providers (and who they represent) are amicable have the potential to be interpreted as insulting, stigmatising or as a representation of expected behaviour when those relationships are antagonistic. The example given in Mullainathan and Shafir (2013[42]) is where 'people who are rewarded for a behaviour they find interesting and enjoyable can come to attribute their interest in the behaviour to the reward and, consequently, come to view the behaviour as less appealing.'

2.3.2. Identity and stereotype threat

Another aspect of a person's utility beyond the material that has expanded our understanding of behaviour is identity. As outlined in detail in George Akerlof and Rachel Kranton's (2010[57]) *Identity Economics: How Our Identities Shape Our Work, Wages, and Well-Being*, the concept of identity can be used to explain decisions in a diverse range of settings including education, the labour market and marriage/partnering. This is because, according to Akerlof and Kranton (2010[57]), "People's identity defines who they are – their social category .'' Furthermore, "there are norms for how someone in those social categories should or should not behave'' and "that norms affect behavior.''

Individuals can have latent or explicit identities, and ones that are active or dormant. And they can be competing. Identity can therefore either reinforce or counterbalance other aspects of a person's utility function. That is, "When people are doing what they think they should be doing, they are happy … But those who are not living up to the norms that they, and others, have set for themselves … are unhappy" (Akerlof and Kranton, 2010[57]). Identity can therefore be used to explain a range of behaviours that reinforce a person's utility or what they would otherwise classify as being in their long-term best interests. For example, a person whose identity is tied to their exercise or healthy eating will gain utility from reinforcing that identity as well as the benefits that flow from that behaviour.

The concept of identity can also be used to explain a person's behaviour that is contra to other aspects of a person's utility function or long-term goals. For example, a person whose identity is related to risk taking behaviour (above and beyond the enjoyment from the behaviour itself) is likely to experience a greater probability of death or serious injury than someone whose identity is related to other pursuits. In a classic paper by George Loewenstein (1999[58]), the author uses the example of mountaineering as a device to question the standard assumptions of utility theory.

Related to this, there are a number of papers that consider the different and generally higher costs of education for minority groups. Akerlof and Kranton (2002[59]) as well as Austen-Smith and Fryer Jr (2005[60]) consider situations where a minority sub-group faces a trade-off between higher wages and the social stigma one gets from their own sub-group. This stigma results from expending time in an activity associated with the majority group. These economic models follow a large body of sociological and ethnographic evidence that certain population subgroups view effort in education as a form of 'selling-out.' The most commonly cited research on this issue is *Learning to Labour: How Working Class Kids Get Working Class Jobs* (Willis, 1977[61]), which studied the resistance to dominant culture by working-class youth in inner-city England.

Even when individuals do not consciously resist education (or other activities related to the dominant culture), their fear, anxiety or concern in a situation which has the potential to confirm a negative stereotype about their social group (stereotype threat) has been shown to worsen their performance. This is particularly likely to happen when that negative stereotype is made salient, for example in a classroom setting or intervention that reinforces the fact that the person's population sub-group performs worse on average. A classic example is the experiment conducted by Steele and Aronson (1995[62]) who showed that black college students in the United States had scores much closer to those of whites in a situation where the test was described as not being diagnostic of ability.

2.3.3. Social interaction, fairness and the moral economy

It has been repeated enough to become a truism. Nonetheless, it is worth repeating that *Homo Sapiens* is a social animal (unlike *Homo Economicus* who cares little for what others think of him/her). This phrase even featured as the title of a recent book by *New York Times* columnist David Brooks (2011[63]) which attempts to explain "the story of how success happens.'' While framed around a fictional narrative, the author summarises a good deal of literature that highlights the role of a person's social situation and skills for their well-being and life chances. There is strong evidence (Kahneman and Krueger, 2006[52]) that those activities that have the greatest association with subjective well-being are essentially social ones with a meta-analysis by Holt-Lunstad, Smith et al. (2010[64]) showing that "The influence of social relationships on risk for mortality is comparable with well-established risk factors for mortality'' like smoking, alcohol and obesity.

Such concerns can lead to a preference for fairness. This is demonstrated through the well-known ultimatum game where an individual is directed to offer a split of a certain amount of money to a second individual. The latter is able to accept that split or reject it, in which case neither participant receives anything. This game has been played in many laboratories but also replicated in a range of field settings. Standard economic theory would suggest that the second player or responder will accept any non-zero offer. Knowing this, the first player or proposer will offer a negligible amount. This is not, however, what is observed in practice, even if the two participants are able to remain anonymous. Rather, proposers often make very generous offers and responders also often reject offers that are positive but deemed to be unfair. According to Mullainathan (2007[65]), the results from such ultimatum games demonstrate that "people care about others and are willing to give up resources to help others, and people react negatively to *perceived* unfair behaviour and are willing to give up resources to punish it'' (italics in original).

Belief in fairness and, related to it, the sharing of resources, has been termed in the anthropological literature as the moral economy. Its current usage stems from the analysis by Thompson (1971[66]) of the working class in 18th Century England and Wales and was defined by Peterson and Taylor (2003[67]) with regards to the Indigenous population as 'the allocation of resources to the reproduction of social relationships at the cost of profit maximisation and obvious immediate personal benefit.' From a policy perspective, the literature on social interaction, fairness and the moral economy suggest that individuals will not necessarily undertake activities that are in their economic self interest if they conflict with their social interests and, furthermore, will reject policies that are perceived (rightly or wrongly) to negatively impact on notions of fairness.

2.3.4. Implicit prejudice and discrimination

Discrimination can be seen from the two sides of a coin. From the side of the 'giver', Becker (2010[68]) defined people as having a 'taste for discrimination' if they acted in such a way that they were "willing to pay something, either directly or in the form of reduced income, to be associated with some persons instead of others.'' From the side of the 'receiver', Altonji and Blank (1999[69]) define labour market discrimination as "a situation in which persons who provide labour market services and who are equally productive in a physical or material sense are treated unequally in a way that is related to an observable characteristic such as race, ethnicity or gender.'' Such definitions work well for aspects of discrimination that are conscious and result from personal animosity or hostility towards another group. More recently, however, behavioural research has shown that most prejudice is implicit and, perhaps even more surprisingly, that implicit discrimination can have a more damaging effect on those who experience it.

Specifically, Hardin and Banaji (2013[70]) define implicit prejudice as that which is "unwitting, unintentional and uncontrollable." An example covered by the authors include a set of experiments where (in the United States) professional police officers were more likely to shoot (simulated) black individuals holding firearms than white individuals and more likely to avoid shooting whites carrying tools (made to look like firearms) than blacks. Hardin and Banaji (2013[70]) also make it clear that "Implicit prejudice is not limited to judgement of others, however, but also affects self-judgement and behaviour, especially with regard to intellectual performance.'' The example they give, from Sinclair, Hardin et al. (2006[71]), relates closely to the issue of stereotype threat mentioned above where females with Asian ancestry performed better on a maths exam when they are primed for (reminded of) their Asian ancestry (which is associated with better maths performance) than when they were primed for their gender (which is associated with worse performance).

The main policy implication of the research on implicit prejudice is that once explicit prejudicial views have been almost eradicated or at the very least made socially unacceptable, significant effort is still required to eliminate the types of prejudice that are unconsciously occurring. Furthermore, legislative change will be much less effective in eliminating this type of prejudice, despite the fact that it has been shown by Hardin and Banaji (2013[70]) to have significant negative consequences on those who are implicitly viewed by others or themselves as having less than ideal traits based solely on their group membership.

3. Applying behavioural economics to education and the COVID crisis

3.1. Behaviouralists who went to school (and university, etc.)

Prior to the spread of COVID-19, there was a large and growing body of research applying behavioural economics/behavioural insights to the education decision. Some of these are cited in the summary of the key general insights above, and some are more specific to the education decision.

Levitt et al. (2016[72]) is perhaps the most explicit, and arguably one of the most comprehensive studies of the application of behavioural insights to the education decision. They summarise a number of experimental interventions in school education, primarily focusing on secondary school students, tying the findings back to many of the theories of human behaviour outlined above. The authors identify a number of results that conform to the key theories of behavioural economics, as well as some that are a bit more of a challenge. These findings are summarised below.

One key finding from Levitt et al. (2016[72]) is that when conducting an experiment on the use of financial incentives to improve test scores (in three low-performing schools in and around Chicago), "We obtain large test score impacts when payments are made immediately, but no impact when rewards are delivered with a one-month delay.'' As explained in section 2.1.2, one of the key findings from the behavioural economics literature is that people are very patient in the long term (e.g. a delay of two years is not that different to a delay of one year), but very impatient in the short term (e.g. a delay of one week or a month is very different to no delay at all). This is a potentially very important explanation for why students under-invest in education when the measured returns are so high, and point to the potential for policy interventions that bring forward rewards and delay costs of education. Furthermore, the authors suggest that, but have less evidence for, "framing the rewards as losses may also increase their effectiveness.''

A second key finding from Levitt et al. (2016[72]) is that extrinsic motivations do not appear to crowd out intrinsic motivations, at least in the context in which they set up their experiments. This is an important counter to some of the behaviourally-informed theories (Bowles, 2016[73]) that if you provide someone with a cash incentive to do something, it may make them less likely to do something that they would have done otherwise because of the intrinsic benefit they get from it. It is difficult to rule out this being the case in any context, but it does appear that it need not happen in every context.

A final key finding from Levitt et al. (2016[72]) is that incentives to undertake certain behaviour can lead to positive habits that remain (as automatisations) after the incentives have been removed. Kahneman (2011[38]) also pointed out that activities that require conscious thought and deliberation (system 2 thinking) are less likely to take place than those activities that are done automatically (system 1 thinking). Furthermore, the research summarised by James Heckman in his own empirical analysis and the analysis of others suggests that those with higher non-cognitive ability do far better across a range of outcomes than those with lower non-cognitive ability, and that the effects are much larger than for measures of cognitive ability; see, for example, Heckman Strixrud and Urzua (2006[74]). Successful study habits can be seen as a form of non-cognitive ability, and the experimental evidence summarised in Levitt et al. (2016[72]) suggest that there are interventions that can support such habits.

In a more recent summary article, Lavecchia et al. (2016[75]) provide additional evidence for some of the findings in Levitt et al. (2016[72]), but also provide some additional insights. One area they focus on that we have covered in detail already is the student's identity, and the authors suggest that "priming students to focus on positive identities related to learning and intellectual curiosity may be one approach for trying to improve education outcomes.''

Lavecchia et al. (2016[75]) also discuss the potential role that information barriers can play in education underinvestment. Standard economic theory would suggest that information is essentially costless, and that all students (and their families) have access to the same amount of information and that they are able to use that information in a consistent way. However, there are a number of experimental and observational studies summarised by the authors that suggest that potential students from disadvantaged background in particular are not making as informed a decision as those who are from advantaged backgrounds. This suggests that interventions that make information more available, and perhaps even more importantly those that make information more digestible and taking into account the subjective filters that information may need to go through, are likely to lead to decisions that are better targeted towards a potential student making a decision that is in their own long term best interests. That is: "opportunities abound to simplify applications or schedules, make them more salient, remind students and parents of education opportunities, and motivate them to want to learn'' (Lavecchia, Liu and Oreopoulos, 2016, p. 63[75]).

A final set of findings, summarised in Koch et al (2015[76]), focus on reducing the small friction costs of accessing education. Standard economic theory would suggest that the cost of completing an application form is far outweighed by the returns from the opportunities that the form completion opens up. However, there is empirical evidence (Bettinger et al., 2012[77]) that making forms far easier to complete, or even better making the education-enhancing option the default, can lead to dramatic improvements in education investment.

3.2. Behaviouralists during the COVID crisis

In a recent article in one of Australia's national newspapers (the *Australian Financial Review*), the headline read: *COVID turbocharges behavioural insights*[5]. While there may be a degree of hyperbole in this statement, it is nonetheless true that the COVID crisis has resulted in a number of interventions that are informed by behavioural insights, and that the rigorous evaluation of these (where that occurs) will improve our understanding of decision making in a variety of different scenarios.

There has been some initial discussion of the behavioural responses to the COVID-19 pandemic in the academic literature. In an initial review of the literature, Van Bavel et al. (2020[78]) concluded that "Because the crisis requires large-scale behaviour change and places significant psychological burdens on individuals, insights from the social and behavioural sciences can be used to help align human behaviour with the recommendations of epidemiologists and public health experts." Although the authors proposed a range of research topics to help inform a behavioural response to the COVID-19 crisis, there has been more limited empirical data to emerge from the crisis, particularly from high quality data collection that is representative of the populations of interest.

One area that has had a significant amount of empirical research is the extent to which behavioural responses (social distancing, wearing of masks, engagement with contact tracing) are more likely to be encouraged by framing that highlights prosocial or altruistic motivations as opposed to framing that highlights self-interested motivations. Like a lot of these types of interventions, context matters quite a lot. Nonetheless, in one study Jordan

[5] https://www.afr.com/politics/covid-turbocharges-behavioural-insights-20201202-p56jtl

et al. (2020[79]) found that “the perceived public threat of coronavirus was more strongly associated with prevention intentions than the perceived personal threat’’ and therefore that prosocial motivations were at least as important in motivating behavioural responses.

One of the findings from the behavioural economic literature is that people often make systematic mistakes when making judgements about risk. A global pandemic is certainly a time when risk/reward decisions are (a) needing to be updated frequently and quickly and (b) likely to be particularly poorly informed as information becomes out of date quite quickly. Dryhurst et al. (2020[80]) showed that risk perception was indeed influenced by characteristics of the individual, not just the actual risk level, finding that “personal experience with the virus, individualistic and prosocial values, hearing about the virus from friends and family, trust in government, science, and medical professionals, personal knowledge of government strategy, and personal and collective efficacy were all significant predictors of risk perception.”

Another area of focus for behavioural insights as applied to the COVID-19 pandemic is vaccine decision making and, in particular, vaccine hesitancy and resistance. At the time of writing, distribution of the first clinically tested vaccine for SARS-COV-2 was about to take place in the United Kingdom. In order to reach a situation of ‘herd immunity’ with a less than 100 % effective vaccine, it will be necessary for a very large proportion of the population to agree to take the vaccination. Standard economic theory would suggest that leaving aside the financial costs and the opportunity costs of time, vaccine hesitancy would be inversely proportional to actual COVID-19 risk. While there is some evidence for this, in a large study of over 3,000 Australian respondents, Edwards et al (2021[81]) found a range of factors that fit behaviourally-informed theories better than standard economic models. Specifically, the authors found that “Females, those living in disadvantaged areas, those who reported that risks of COVID-19 was overstated, those who had more populist views and higher levels of religiosity were more likely to be hesitant or resistant while those who had higher levels of household income, those who had higher levels of social distancing, who downloaded the COVID-Safe App, who had more confidence in their state or territory government or confidence in their hospitals, or were more supportive of migration were more likely to intend to get vaccinated.”

4. Behavioural insights and education – utilising existing data

The previous sections provided a summary of a range of existing literature that ties findings from the behavioural sciences to public policy broadly, as well as the education decision and response to the COVID-19 pandemic in particular. Much of this research has come from lab or field experiments, which allow for careful estimation of causal models that can be closely tied to theoretical questions. The downsides of this experimental data, however, are that they are rarely based on nationally representative let alone cross-nationally representative samples, nor do they allow for the estimation of relationships between variables that are not amenable to experimental manipulation.

This section of the paper draws on observational data from targeted surveys that, while more limited in causal inference, allow us to analyse a more diverse set of relationships. In particular, we draw on new empirical analysis of the 2018 waves of the Programme for International Student Assessment, which 'measures 15-year-olds' ability to use their reading, mathematics and science knowledge and skills to meet real-life challenges[6].' The survey was carried out across 37 OECD member countries, and a further 42 partner countries and economies (i.e. regions within countries)

4.1. Relationship between student belonging and school resources

This paper's empirical exploration of how behavioural insights can help the policy response to the education crisis by analysing the factors associated with school belonging, and in particular the extent to which the resources available to schools support school belonging. The motivation for the analysis is that, as described above, there is a considerable amount of empirical evidence from both experimental and observational data that the greater attachment a student has to their school and their identity as a student, the more likely they are to attend regularly and pursue education beyond the compulsory years.

The dependent variable in the model is the index of sense of belonging (BELONG). This index variable was constructed by the OECD (2019[82]) based on student responses to the following set of statements with possible response options of strongly disagree; disagree; agree; and strongly agree:

- I feel like an outsider (or left out of things) at school;
- I make friends easily at school;
- I feel like I belong at school;
- I feel awkward and out of place in my school;
- Other students seem to like me; and
- I feel lonely at school.

In a review of the index, the OECD (2019[83]) summarised the concept and the validation of the instrument such that 'a sense of belonging at school reflects how accepted, respected and supported students feel in their social context at school' and that 'students reporting a greater sense of belonging at school tend to display higher academic motivation, self-esteem and achievement'

[6] http://www.oecd.org/pisa/

The index derived by the OECD is scaled to have a mean of zero, with positive values on this scale meaning that students reported a greater sense of belonging at school than did the average student across OECD countries. Across the entire sample (that is, OECD and non-OECD countries without weights) the mean value for the index is -0.066 (to three decimal places) and the standard deviation is 0.973.

Using a regression model, analysis conducted aimed to understand whether a set of school-level factors were associated with the student belonging index. The school-level factors are constructed as additive indices based on the number of items in that group of questions that the school principal responded to as being above a particular threshold. Specifically, the indices are constructed as follows:

- School activities – Principals were asked which of a list of 11 activities the school offers for students in the modal grade for 15 year old students. A value of one is given for each activity, with an average across the entire sample of 6.77 activities;
- School constraints – Principals were asked about whether their school's capacity to provide instruction was hindered by eight potential issues, with response options ranging from not at all; very little; to some extent; and a lot. If we set a threshold of at least 'very little', then the average number of constraints across the sample is 4.58;
- Student learning – Principals were asked whether 11 types of phenomena are a hindrance to student learning within their school, with response options of not at all; very Little; to some extent; and a lot. If we set a threshold of at least 'very little', then the average number of hindrances across the sample is 8.08;
- Digital capacity – Principals were asked to what extent they agree with a set of statements about their school's capacity to enhance learning and teaching using digital devices. Before answering the questions, they were asked to "Please think of different kinds of digital devices such as for example desktop computers, portable laptops, tablet computers or interactive whiteboards." For each of the 11 statements, principals were asked whether they strongly disagree; disagree; agree; or strongly disagree. Combining those who agree and strongly agree, the average value across the sample is 6.79.

In addition to the indices, this model also includes three variables for whether the school provided particular types of study help. The mdoel also uses three separate binary variables for whether or not the school provides each of these three types of study help:

- Room(s) where the students can do their homework, with 64.6 % of students across the sample attending a school with that type of study help;
- Staff help with homework, with 57.9 % of students across the sample attending a school with that type of study help; and
- Peer-to-peer tutoring, with 59.8 % of students across the sample attending a school with that type of study help.
- In addition to the school-level variables, we control for a range of characteristics of the student, as follows:
- A set of dummy variables for the grade in which the student is attending (with Year 10 the modal and therefore omitted category);
- A dummy variable if the student is female;
- A set of dummy variables for the number of books in the student's home (with 26-100 books the modal and therefore omitted category);
- A dummy variable if the student was born outside of the country they were tested in;

- A dummy variable if the student spoke a language other than the language of testing at home;
- An index of home possessions, constructed by the OECD; and
- An index of wealth, constructed by the OECD.

The final set of variables we include in our model is a dummy variable for each of the 82 countries in our sample. The country with the largest student sample in 2018 was Spain, and we therefore set that as our omitted category. By including a country-dummy we essentially construct a fixed-effects model and therefore abstract from variation in school belonging across countries, estimating whether variation in school characteristics within countries is associated with a student's sense of belonging. However, by using dummy variables rather than a standard fixed-effects model, the model is able to incorporate the complex survey-design of programme for International Student Assessment (PISA) and the survey-weights generated by the OECD[7]. The estimated dummy variables for each country are available in an online appendix.

Table 1. Factors associated with index of student belonging, 2018

Explanatory variables	Coefficient	Significance
School activities	0.0052	**
School constraints	0.0007	
Student learning	-0.0055	***
Digital capacity	0.0021	
Study help – rooms	0.0010	
Study help – staff	-0.0141	
Study help – peers	0.0162	*
Grade 7	-0.3615	***
Grade 8	-0.1809	***
Grade 9	-0.0507	***
Grade 11	0.0012	
Grade 12	-0.0899	
Grade 13	-0.4096	***
Female	-0.0242	***
0-10 books	-0.0238	**
11-25 books	-0.0016	
101-200 books	-0.0141	
201-500 books	-0.0407	***
More than 500 books	-0.0981	***
Migrants	-0.0773	***
Speaks another language	-0.0051	
Index of home possessions	0.0859	***
Index of student wealth	0.0029	
Sample size	438,976	
R-squared	0.0489	

[7] A formal fixed effects model without weights has very similar findings, albeit with somewhat lower estimated standard errors.

Note: Linear regression model. Coefficients that are statistically significant at the 1 % level of significance are labelled ***; those significant at the 5 % level of significance are labelled **, and those significant at the 10 % level of significance are labelled *.
Source: Customised calculations using unit record data, OECD Programme for International Student Assessment (PISA), 2018.

Before discussing the findings related to the school characteristics, it is worth briefly discussing the other factors associated with student belonging. Those in the modal Year level have the greatest level of school belonging; females have a lower level of school belonging than males; those with a very low (0-10 books) or very high (201 books or more) number of books having lower school belonging; migrants having a lower level of belonging; and those with a greater number of home possessions having a greater level of student belonging.

Controlling for these individual-level characteristics, as well as the country-level fixed-effect, the analysis finds three school-level factors that were associated with a student feeling that they belong in the school. Specifically, those schools that provide a greater number of activities have students with a greater sense of belonging, those with greater hindrances to student learning having a lower sense of belonging and those that provide peer-to-peer tutoring having a greater sense of belonging.

There is one activity in particular that has a strong association with school belonging. Principals were asked whether the school provided ‘volunteering or service activities’, with 79.9 % of students in the sample attending such a school. When controlling for all the variables in Table 1, and including the activities as individual binary variables rather than as an additive index, those students who attended a school with volunteering or service activities have an index value 0.0418 higher than those who did not.

In addition, there was one particular hindrance to learning that had a strong association with school belonging. Across the entire sample 75.4 % of students attended a school where the principal reported truancy as a hindrance to student learning. In a model with the same variables as in Table 1, but where the individual student learning hindrances are separate binary variables, the school belonging index was 0.0389 lower for those where truancy was an issue compared to those that were this was not the case.

4.2. Determinants of self-perceived value of schooling

The standard human capital model, used for decades by academic economists and the basis for most countries’ education policies is that individuals will invest in education until the returns no longer outweigh the costs (Sweetland, 1996[84]). The model has been continuously expanded and modified since Gary Becker (1962[85]) first formally articulated the theory, including careful consideration of the opportunity cost of studying, the impact of risk preference, returns/costs that extend beyond income, and uncertainty around returns.

There is a large sub-field of the economics of education that considers variation in perceived returns to education. As argued by Jensen (2010[86]) “Though many studies estimate … returns with earnings data, it is the *perceived* returns that affect schooling decisions, and these perceptions may be inaccurate” [emphasis in original]. In Jensen’s ([86]) analysis, the author shows that (in the Dominican Republic) not only are the perceived returns to education lower than suggested by the measured earnings data, that students who attended a randomly selected set of schools that are given information about the high measured returns complete more school on average than those in control schools.

There has been less research, however, that considers the extent to which perceived returns vary across or within countries. The behavioural models discussed earlier suggest that students under financial stress will discount the future and focus on short-term costs of schooling (scarcity), will be impacted by how information on returns to education are presented to them (framing) and will be influenced by whether a certain level of schooling is the default in their country or their family/cultural circumstance (loss aversion). The COVID crisis is likely to have exacerbated some of these biases by changing the expected future labour market that students will graduate into, the current labour market that provides the alternative to schooling (and therefore the opportunity costs of studying), and by changing the form of instruction that students receive. Empirically, early evidence from Ahn et al. (2020[87]) suggests that “high school completion rates increased considerably in 2020 compared to previous years” with the authors suggested that this was mainly due to the lower opportunity cost of studying. More indirectly, the stress and financial pressure from the crisis may make people even more present biased and loss averse.

The following table considers the relationship between a range of school and individual characteristics and an index constructed by the OECD capturing the students perceived value of school. Specifically, the index is based on the extent to which students agree (“strongly disagree”, “disagree”, “agree”, “strongly agree”) with the following school-related statements:

- “Trying hard at school will help me get a good job “;
- “Trying hard at school will help me get into a good college”; and
- “Trying hard at school is important”.

The index derived by the OECD is scaled to have a mean of zero, with positive values on this scale meaning that that the student valued schooling to a greater extent than the average student across OECD countries. Across the entire sample (that is, OECD and non-OECD countries without weights) the mean value for the index is 0.011 (to three decimal places) and the standard deviation is 1.013.

In model 1, we estimate the same model as before, but also include as an additional explanatory variable the measure of student belonging, as well as a measure of the highest level of education for the child’s mother and father. In models 2-4, we also include (sequentially), the mathematics, reading and science scores for that particular student.

Focusing on Model 1 to start with, a clear finding from the results presented in Table 2 is that those who have a greater sense of belonging at school are significantly and substantially more likely to see a perceived value in schooling. Independent of the direct impact of belonging on the social costs/benefits of schooling, this suggests that policies and support that can improve school belonging can also help students see school as being of value for the future labour market and formal education.

The school-level variables that were associated with school belonging were not (independently) related to perceived value of schooling. There were, however, a number of other individual and family level variables that were important. Students in higher grades saw a greater value in schooling, potentially suggesting that as students get towards the end of their school career the benefits of school become more apparent. Females perceived a much greater value of schooling than males, potentially explaining why females continue to invest in much higher levels of education than males, and potentially explained by expected future discrimination in the labour market, whereby those who perceive greater levels of discrimination compensate by investing in higher levels of education (Altonji and Blank, 1999[69]); (Lang and Manove, 2011[88])). There are no differences in perceived values of schooling for migrants and those who speak a different language to the language of testing in that country.

There are somewhat complex and contradictory relationships with some of the other household measures. Students in the modal category for number of books in the household (26-100 books) had the highest level of perceived value of schooling, with a greater perceived value reported than those with fewer or more books. Students with a greater level of home possessions were associated with greater perceived value, but controlling for that, students' wealth was associated with a lower level of perceived value. The later finding may suggest that those who have reasonably secure financial circumstances do not see the need to invest in their own human capital as much as those with less financial capital or, to put it another way, that those who are less secure financially see the need to compensate with over-investment in education[8]. Finally, higher educational attainment of a student's mother was associated with lower perceived value of schooling for the student.

Looking at Model 2 to 4, analysis conducted shows that all three domains of student learning are associated with a higher perceived value of schooling, with the strongest association for a student's reading score. While this is perhaps not surprising, a higher level of cognitive ability is assumed in the human capital model to be associated with a lower cost or higher return to education; it does highlight one of the potential impacts of the education crisis on future education outcome. A consistent finding has been that restrictions on face-to-face instruction has led to impacts on development of cognitive skills (Hammerstein et al., 2021[89]). This will need to be tested carefully with future waves of PISA, but if it turns out to have long lasting effects on learning, then it is highly likely that students will have a lower perceived value of schooling than they otherwise would, compounding the impact of the pandemic.

[8] Rather than use ISA measure of socio-economic status (ESCS), which combines parental education, parental occupation, and household possessions, we use individual components separately to explicitly test for specific associations, and in particular the differential association between mother's and father's education. It should be noted though that there is a strong correlation between the wealth and possessions variables and that in models that do not control for possessions, the wealth variable may have very different associations. The coefficients on the other variables in the model do not change when ESCS is used instead.

Table 2. Factors associated with perceived value of schooling, 2018

	Model 1		Model 2 - Reading		Model 3 - Math		Model 4 - Science	
Explanatory variables	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.
School belonging	0.1787	***	0.1748	***	0.1764	***	0.1768	***
School activities	0.0020		-0.0004		0.0005		0.0005	
School constraints	0.0016		0.0028		0.0026		0.0023	
Student learning	-0.0008		-0.0002		-0.0004		-0.0004	
Digital capacity	0.0010		0.0007		0.0008		0.0008	
Study help - rooms	0.0018		-0.0017		-0.0012		-0.0010	
Study help - staff	0.0139		0.0163		0.0153		0.0150	
Study help - peers	0.0032		0.0005		0.0007		0.0009	
Grade 7	-0.1607	***	-0.1175	***	-0.1317	***	-0.1372	***
Grade 8	-0.0980	***	-0.0583	**	-0.0685	**	-0.0717	***
Grade 9	-0.0353	***	-0.0159		-0.0226	**	-0.0224	**
Grade 11	-0.0436	***	-0.0592	***	-0.0531	***	-0.0537	***
Grade 12	0.0499		0.0454		0.0498		0.0488	
Grade 13	0.5771	***	0.4881	**	0.5239	**	0.5141	**
Female	0.1443	***	0.1388	***	0.1547	***	0.1530	***
0-10 books	-0.0115		0.0111		0.0046		0.0056	
11-25 books	-0.0052		0.0072		0.0043		0.0046	
101-200 books	-0.0173	*	-0.0238	**	-0.0218	**	-0.0219	**
201-500 books	-0.0471	***	-0.0600	***	-0.0547	***	-0.0563	***
More than 500 books	-0.0164		-0.0167		-0.0163		-0.0184	
Migrants	-0.0272		-0.0201		-0.0222		-0.0204	
Speaks another language	-0.0134		-0.0084		-0.0142		-0.0113	
Index of home possessions	0.0905	***	0.0753	***	0.0807	***	0.0797	***
Index of student wealth	-0.0616	***	-0.0520	***	-0.0559	***	-0.0543	***
Mother's education	-0.0120	***	-0.0134	***	-0.0130	***	-0.0131	***
Father's education	0.0031		0.0015		0.0020		0.0019	
Test score			0.0007	***	0.0005	***	0.0005	***
Sample size	290,652		286,894		286,894		286,894	
R-squared	0.1255		0.1530		0.1494		0.1499	

Note: Linear regression model. Coefficients that are statistically significant at the 1 % level of significance are labelled ***; those significant at the 5 % level of significance are labelled **, and those significant at the 10 % level of significance are labelled *.
Source: Programme for International Student Assessment (PISA), 2018.

4.3. Occupation choice and financial resources

As discussed in Section 2 (and in particular 2.3.1), two individuals who have access to the same information may interpret this information in very different ways, and make decisions accordingly. One of the key variables in the index of the perceived value of schooling that may be perceived differently is a student's view on whether trying hard in school would help them get a good job. Across the weighted sample, there is strong agreement with this statement, with 48.5 % of students strongly agreeing, and 39.2 % agreeing.

Leading up to the COVID-19 pandemic, there was considerable debate as to the future of work in OECD and non-OECD countries with concern that technological change had the potential and even likelihood of destroying more jobs than it created. While some economists and policy makers were less concerned than others, believing or producing evidence that the net effect would be positive, almost all researchers and policy makers who considered the subject were of the view that whatever the overall change, there would be uneven effects across countries, regions and individuals.

The COVID-19 pandemic has in many ways accelerated these trends, with many firms adapting to physical distancing restrictions by substituting labour for technology (Chernoff and Warman, 2020[90]). It is unclear whether the recovery from the pandemic will see a return of all the jobs that were lost. However, it is highly likely the jobs that are recreated after the pandemic will be different to those that were lost. Those that benefit from the labour market shock are likely to be the most skilled (in terms of cognitive and non-cognitive ability) as well as those who already are in growth occupations or those that are closely associated with new occupations that are created.

Students who undertook the 2018 PISA ([83]) were asked "What kind of job do you expect to have when you are 30 years old." Although someone's expectations at age 15 are not completely predictive of what their occupation will be at age 30, they may be suggestive to a certain extent of what types of human capital they invest in, and what opportunities they pursue. A potential future research opportunity will be to map responses to this question to occupations that are likely to grow post-pandemic as opposed to ones that are likely to decline. Until the shape of the post-pandemic labour market is more apparent, however, a useful preliminary proxy is the status of the occupation the students expect to be working in. While there will be some high status occupations that become less prominent post-pandemic and some low status occupations that become more of a feature of the labour market, if previous trends are accelerated by the pandemic then it is likely that high status occupations will on average grow relative to low status ones.

To examine the factors associated with occupational status, and therefore some of the behavioural biases that may be exacerbated by the pandemic, we once again estimate four models, with the first model not including any test scores, and models 2 to 4 including reading, maths, and science in sequence. The dependent variable is the status of the student's expected occupation and we use the same explanatory variables that we used in Table 2, with the addition of the student's index of perceived value, as well as the occupation status of the student's mother and father.

Those who have a strong belief in the value of education and those who have a strong sense of belonging at school are more likely to expect to have a high status occupation, conditional on other observed characteristics. While this may not be surprising, it does highlight the potential benefits of targeting and enhancing these attitudes and beliefs.

Most of the school-level measures were statistically significant, but not always in the way expected. Students who attend schools with a greater number of school activities are more likely to expect to have a high status occupation, whereas those who attend schools with greater constraint or hindrances to learning expect to have a lower status occupation. There was also, however, a small but still negative association with the school's digital capacity and their student's occupational expectations.

There is no association with rooms where students can do their homework, but there is a very large negative association with having staff available to help with homework. It is unclear what is driving this finding, but it may be due to reverse causality whereby those schools where students are likely to have low expectations target resources to remedial homework support. On a more positive note, those schools with peer-to-peer homework support had a positive association with occupational expectations.

On balance, schools that provide a better learning environment have students who expect to have a higher status occupation, even controlling for characteristics of the student. To the extent that the pandemic will reduce school budgets, any cutting back on the learning environment or access to resources due to schools being closed, the lower the potential expectations of students and therefore the lower the availability of students who invest in the skills required for the occupations of the future.

Females have significantly and substantially greater expectations for high status occupations, as do migrations and those who speak a language other than the language of instruction.

One of the more important findings though is that home possessions, a proxy for financial security are positively associated with occupational expectations (even when controlling for parental education and occupation). While this is not quite a measure of financial stress, those with a greater number of possessions are likely to be under less financial stress than those with fewer possessions. As the pandemic exacerbates financial stress, it is likely that some students may reduce their expectations for their own future career, settling for occupations that may have lower status (and are therefore are of lower pay and of less security) but that may be easier to obtain or require less human capital investment.

The final finding from the analysis (in Models 2 to 4) is that a student's test scores are strongly predictive of their occupational expectations. Unlike in the previous sub-section, however, the test domains had a similar association. What this suggests is that any negative impacts on student learning from the pandemic will potentially translate into a more pessimistic set of expectations for students' future occupation, and therefore underinvestment in skills and other forms of human capital investment.

Table 3. Factors associated with occupational expectation, 2018

	Model 1		Model 2 - Reading		Model 3 - Math		Model 4 - Science	
Explanatory variables	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.
Perceived value of schooling	1.1531	***	1.0358	***	1.0947	***	1.0924	***
School belonging	0.4009	***	0.2457	***	0.2882	***	0.3227	***
School activities	0.3502	***	0.2227	***	0.2419	***	0.2421	***
School constraints	-0.0781		-0.0180		-0.0114		-0.0295	
Student learning	-0.1054	**	-0.0619		-0.0564		-0.0608	
Digital capacity	0.0097		-0.0109		-0.0080		-0.0117	
Study help – rooms	0.1270		0.0913		0.0735		0.0964	
Study help – Staff	-0.5676	**	-0.4093	*	-0.3861		-0.4212	*
Study help – peers	0.1331		0.1289		0.0769		0.1064	
Grade 7	-8.1537	***	-5.2058	**	-5.4220	**	-5.7590	**
Grade 8	-4.7859	***	-2.6084	***	-2.5886	***	-2.7828	***
Grade 9	-2.4369	***	-1.2609	***	-1.3383	***	-1.3165	***
Grade 11	1.0738	***	0.3608		0.5260		0.4921	
Grade 12	3.3998	**	3.4847	*	3.8522	*	3.6082	*
Grade 13	0.9285		-3.2006		-2.2028		-3.3496	
Female	5.4274	***	4.9721	***	5.9806	***	5.8406	***
0-10 books	-2.1896	***	-1.3268	***	-1.4234	***	-1.3541	***
11-25 books	-1.3522	***	-0.7660	***	-0.7578	***	-0.7515	***
101-200 books	0.5113	**	0.1868		0.2281		0.1887	
201-500 books	0.9754	***	0.3429		0.4712		0.3576	
More than 500 books	-0.4060		-0.4731		-0.4687		-0.6736	
Migrants	3.1691	***	3.3381	***	3.3406	***	3.5294	***
Speaks another language	0.9956	***	1.2705	***	0.9635	**	1.1417	***
Index of home possessions	2.2515	***	1.3806	***	1.5076	***	1.4256	***
Index of student wealth	-1.6203	***	-1.0408	***	-1.2001	***	-1.0585	***
Mother's education	-0.1534	**	-0.1426	**	-0.1292	**	-0.1416	**
Father's education	0.1751	***	0.1655	**	0.1622	**	0.1600	**
Mother's occupation status	0.0509	***	0.0370	***	0.0378	***	0.0383	***
Father's occupation status	0.0689	***	0.0508	***	0.0536	***	0.0531	***
Test score			0.0382	***	0.0370	***	0.0378	***
Sample size	290 652		286 894		286 894		286 894	
R-squared	0.1255		0.1530		0.1494		0.1499	

Note: Linear regression model. Coefficients that are statistically significant at the 1 % level of significance are labelled ***; those significant at the 5 % level of significance are labelled **, and those significant at the 10 % level of significance are labelled *.
Source: Programmefor International Student Assessment (PISA), 2018.

4.4. Relationship between student belonging and country-level behavioural preferences

The previous three sections analysed the school- and individual-level factors associated with school belonging and the self-perceived value of schooling. As part of the model, the analysis included a country-level fixed-effect in order to analyse specifically the extent to which variation in school and individual characteristics explained variation at the student level. This section takes one step further back to consider the extent to which variation in some of the behavioural biases described in Section 2 are correlated with a range of student outcomes.

Specifically, it utilises data from the Global Preferences Survey or GPS[9], which includes measures of risk and time preferences; positive and negative reciprocity; altruism; and trust. Existing analysis has shown that national and sub-national variation in behavioural biases captured by the survey can explain differences in development outcomes. This section extends this analysis by looking at the relationship between behavioural biases and subjective outcomes of students based on indices created for PISA.

Specifically, the author created average values (using population weights) for four of the student-level indices for each country that undertook PISA. Two of these variables have been analysed in the previous sub-sections (school belonging and value of school), but this section also analyses the country-level determinants of self-efficacy (resilience) and cognitive flexibility.

Self-efficacy or resilience is based on the extent to which students agree ("strongly disagree", "disagree, "agree", "strongly agree") with the following statements about themselves:

- "I usually manage one way or another";
- "I feel proud that I have accomplished things";
- "I feel that I can handle many things at a time";
- "My belief in myself gets me through hard times"; and
- "When I'm in a difficult situation, I can usually find my way out of it".

Positive values in this index mean that the student reported higher self-efficacy than did the average student across OECD countries.

Using a regression approach, the model analyses the relationship between these variables and the six behavioural preferences as part of the GPS: patience, risk taking, positive reciprocity, negative reciprocity, altruism, and trust. In total, there were 48 countries in the PISA dataset and the GPS dataset.

Detailed results are presented in Table 4. In summary though, the behavioural preferences in this analysis explain very little of the variation in average cognitive flexibility (R-Squared = 0.0812) with none of the six explanatory variables being statistically significant. They explain much more of the variation in self-efficacy (R-Squared = 0.3263), value of school (R-Squared = 0.2214), and school belonging (R-Squared = 0.1540)

Looking at the relationships that were statistically significant, those countries that ranked relatively highly on risk taking and trust had a higher value for self-efficacy. Controlling for these characteristics though, there was a negative relationship between patience and self-efficacy. There was a strong positive relationship between altruism at the country-level and perceived value of schooling, though there was a negative relationship with positive reciprocity. Finally, there was a positive relationship between patience and school belonging, with a negative relationship between risk taking and school belonging.

[9] https://www.briq-institute.org/global-preferences/home

Table 4. Relationship between average education values from PISA (2018) and behavioural preferences from the GPS (2012)

	School belonging		Value of school		Self-efficacy		Cognitive flexibility	
Explanatory variables	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.
Patience	0.167	**	0.056		-0.229	***	0.082	
Risk taking	-0.245		-0.091		0.393	***	-0.010	
Positive reciprocity	0.048		-0.274	*	-0.056		0.023	
Negative reciprocity	0.128		-0.070		-0.084		-0.033	
Altruism	0.002		0.378	***	-0.079		-0.153	
Trust	-0.004		0.169		0.237	**	0.021	
Constant	-0.091	***	0.015		0.104	***	-0.017	
Sample size	47		48		47		41	
R-squared	0.1540		0.2214		0.3263		0.0812	

Note: Linear regression model. Coefficients that are statistically significant at the 1 % level of significance are labelled ***; those significant at the 5 % level of significance are labelled **, and those significant at the 10 % level of significance are labelled *.
Source: Programme for International Student Assessment (PISA), 2018.

5. Concluding comments and policy pointers

The COVID-19 pandemic adds to pre-existing challenges facing education systems, and has placed significant strain on health and economic systems across OECD and non-OECD countries. Some of the pre-existing challenges identified in the introduction to this paper include a rapidly changing labour market, the impacts and necessary response to human-induced climate change, and ongoing inequalities within and between countries in education opportunities and outcomes. There have also been specific impacts of the pandemic on education systems, including pressure on education budgets, a loss of instruction time, stress and anxiety for students and educators, and restrictions on student mobility. Not all countries have been impacted to the same degree. And not all subject areas or levels of education have been impacted as much as others. However, all students have been impacted, and there are likely to be lingering impacts of the COVID-induced education crisis for years to come.

In responding to this education crises, it is important to build any policy responses on the most rigorous and up-to-date evidence that is available. One broad field of study that can help design a more effective response is the field of behavioural insights, which includes behavioural economics, social psychology, education psychology, and a range of related disciplines. A core policy-insight from these fields is that policy is likely to be far more effective if it is based on how people actually make decisions, not how our models of human behaviour often assume they make decisions. In general, the literature summarised in this paper shows that people are neither completely rational, or completely irrational. Rather, they exhibit a set of biases that make it more difficult and less likely that they will make decisions in a way that enhance their own utility or well-being.

This paper presents a number of empirical findings that illustrate some of these biases, with a focus on biases that may exacerbate in education crises. Some policy pointers emerge from this evidence.

5.1. Attachment matters, as do school resources

Analysis in this paper shows that attachment matters. Students who have a greater subjective belonging to schooling are more likely to see value in education and aspire to a high status occupation. This sense of belonging is, however, strongly correlated with school resources, and therefore any reductions to school (or other education) budgets will likely lead to a disengagement from schooling and related reductions in human capital development. It is tempting from a policy perspective to focus a declining school budget on basic literacy and numeracy. This should not be ignored, as students from a disadvantaged background in particular are likely to have suffered from a loss of instructional time in these areas. However, resources also need to be set aside for ways to maintain the attachment students have to their school or education institution.

5.2. Disruptions to literacy and numeracy development have many flow-on effects

One of the greatest concerns amongst education policy makers during the COVID-19 pandemic is that loss of face-to-face instructional time will slow the development of cognitive and non-cognitive skills development. Development of literacy and numeracy is important in and of itself for the human capital of the future workforce and citizenry. However, results presented in this paper have highlighted how lower literacy, numeracy and science skills can also diminish the value that students place on learning, as well as the expectations they have for their future career. As it is probably inevitable that literacy, numeracy and science knowledge will be less than it otherwise would have been in the absence of the pandemic, there is a potential need to directly target perceived returns and occupational expectations through evidence-based and well evaluated interventions.

5.3. Identifying behavioural biases can direct systems towards more effective targeted interventions

The analysis conducted also finds that at the national level, there is a strong correlation between some of the behavioural preferences discussed earlier in this paper and education outcome measures collected by the OECD in the PISA surveys. From a policy perspective, this creates an opportunity for education systems to identify those preferences and biases that are most common in their society and target interventions accordingly. For example, it was shown that high levels of altruism in the country was correlated with a high-perceived value of schooling (potentially because the societal returns to education are more salient). Those countries with low altruism as measured by comparative surveys may need to find evidence-based interventions that boost the perceived value of schooling. Another example from our research was that there was a positive relationship between patience and school belonging and a negative relationship between risk taking and school belonging. Those countries with low patience and high risk may therefore need to develop interventions that increase the sense of belonging that students have to their school in order to counterbalance the behavioural drivers pulling in the opposite direction.

Perhaps even more promising from a policy perspective is the potential for such interventions to occur at the sub-national or individual school/student level. PISA already collects a range of subjective information from students, and we would suggest considering the collection of information on some of the behavioural biases from the Global Preferences Study in future waves of PISA or similar datasets. This would allow for an individual-level analysis of the relationship between behavioural biases and education decision-making, and more targeted policy interventions.

5.4. Behavioural biases are more likely to happen in the current context, but targeted policy measures can help counteract them

One of the key findings from the behavioural literature is that people who are in positions of financial stress are more prone to many of the behavioural biases that reduce the chances that they will make decisions that are in their own stated best interests. Evidence analysed in this paper suggests shows that, controlling for a range of other background measures (including school achievement), those students who are in a more precarious financial position are less likely to expect to work in occupations that are more protected in the future labour market.

The COVID-19 pandemic has led to significant financial stress for many students and their families. This is in addition to the stress caused by fear of infection and loss of social interaction. Based on a very large amount of experimental and observational data, this stress is likely to lead students and educators to become more present biased, less willing to take risks, less altruistic, and more likely to make decisions based on their implicit biases. All these behavioural biases have the potential to reduce education investments, and inhibit learning.

In addition to supporting the more foundational aspects of education, education systems may therefore need to counteract the potential increases in biases by targeted and well evaluated interventions that can support students to be future orientated, willing to take appropriate risks, and take into account the broader societal impacts of education. In addition, educators may need support to reduce their own biases, and importantly to not fall back on some of the biases (racial, ethnic, gender, class, etc.) that can become more pronounced at times of financial stress.

5.5. The limits of this study and the power of high quality surveys and evaluations

The paper has not attempted, nor would it be possible to empirically examine all the potential aspects of the COVID-induced education crisis, even within the behavioural fields of enquiry outlined above. One area that has been considered only very briefly in this paper is the decision-making of teachers and other educators, or of policy makers. However, these agents within education systems are equally prone to biases as students or their families, and are deserving of dedicated studies themselves.

A further limitation, and one that was identified early in the paper, is that the analysis was carried out on data from prior to the pandemic. Collection of data for the next wave of PISA has been pushed back from 2021 to 2022, four years after the last wave of data and the one used in this paper. While in many ways this makes sense due to the difficulty in conducting data collection during a pandemic, it does mean that the policy and research community does not have such a comprehensive dataset to understand outcomes, attitudes, and decisions during the pandemic period.

One of the benefits of the data used in the analysis in this paper is that it is generally representative of the populations of interest, and is available for many dozens of countries with different histories, languages, cultures, and socioeconomic outcomes. This partially addresses some of the criticisms of behavioural sciences and related disciplines that theories have been generated from trials and experiments in countries that are WEIRD (i.e. Western, Educated, Industrialised, Rich, and Democratic). Using such data with high external validity almost inevitably comes at the cost though of internal validity and the ability to make causal inference. Where causal statements have been made in this paper, they have been based on studies using lab, field, or quasi-experimental approaches.

Ultimately, one of the key contributions from the fields related to behavioural insights has been to show the cost-saving benefits of well targeted interventions that are built on a strong evidentiary base. There will be pressure to cut back on high quality surveys a well as trials and evaluations as education budgets shrink and have more pressure placed on them. However, well targeted and well evaluated trials that make use of large surveys or administrative data systems can point education systems towards more cost-effective delivery of services, and it would be a real cost of the COVID-19 pandemic if these surveys, trials and evaluations were significantly cut back, or made less robust.

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