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DISCUSSION PAPER

THE CASE FOR CHARACTER SKILLS NAVIGATING NEW ZEALAND'S FUTURE OF WORK

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KIERAN MADDEN*

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"Yes, excessive automation at Tesla was a mistake...Humans are underrated."[1]
– Tesla CEO, Elon Musk

"Intelligence plus character–that is the goal of true education."[2]
– Martin Luther King

* *We would like to thank those whose feedback, advice and ideas helped contribute to this paper.*

The paper in summary...

> *"Intelligence plus character—that is the goal of true education."*
> *– Martin Luther King*

Success early on in life is about more than just doing well in academic tests. What these tests don't necessarily capture is what we call "character skills," skills valued by employers in New Zealand and across the world. Due to the ever-increasing uncertainty of the future of work and the ever-expanding role of technology, this demand is only going to grow. We must re-balance and re-imagine our skills development pathways to meet this new reality.

Character skills are known by many names. Economists tend to refer to non-cognitive skills; psychologists to personality traits; educationalists to Social and Emotional Learning (SEL); futurists to 21st century skills; business leaders to soft skills; and philosophers to character virtues. **The subset of character skills we explore can be called "performance" virtues and include perseverance, motivation, and self-control.** These must be understood and situated in the broader context of other intellectual, moral, and civic virtues.

Character skills developed early in life contribute to future success in school, work, and life more generally at a similar rate to test scores, and in some cases, even more. There is good evidence that developing these skills results in higher wages, less use of health and social services, and avoidance of the criminal justice system. One academic calls these skills "the missing piece" in education.

Character skills are increasingly valuable in the workplace and employers are struggling to find workers with these skills. As some of the fastest-growing sectors of the economy rely on people with these skills, they are in demand and being rewarded now, and this will only grow in the future with advances in automation and AI on the horizon. Technology has and will continue changing how we work and we must adapt our education, training, and development systems to give people the best chance of flourishing, not just in the workplace but in other areas of life too.

Character skills are not just a "nice-to-have," they are critical to our future for work and education success. We must shift from viewing the future as a threat—with nightmarish visions of robots causing mass unemployment—to one of opportunity: where jobs of the future harness the complementary strengths of humans and technology. That which makes us human will be our most valuable asset in the future, as we strive to become "first-class humans" rather than "second-class robots."

While the evidence is maturing in this relatively-new and fast-expanding field, there is good neuroscientific, economic, and psychological rationale for seeking to understand and build these skills. Policymakers should proceed with caution and optimism. Focusing on the early years and the disadvantaged in particular, and investing in parenting, relationships, and evidence-based programmes in schools will go a long way towards better outcomes. Parents and caregivers, schools, community organisations, and employers all have complementary roles to play to make a difference on the developmental trajectory of New Zealanders.

The paper explores:

- **The nature of character skills:** what they are, how we can define and categorise them, and why we chose a particular conception;
- **The demand for character skills in the economy**: what the future of work will likely look like, and which kinds of skills will be most sought after;
- **The empirical evidence**: the extent they can be developed and which kinds of interventions are most effective; and

- **Principles and policies aimed at re-imagining our education, training, and development** environment to a skills system that is fit-for-purpose and for the future.

We recommend the following series of broad policy principles for consideration:

1. **Early childhood is a critical period for intervention**
   Neuroscientific evidence shows how the early years are a critical and sensitive time for developing character skills. Promoting responsive relationships between children and parents/caregivers and reducing "toxic" stress in children's lives is a key part of this. Skills development is cumulative, so children who develop them earlier have a head-start in life.
2. **Focusing on the disadvantaged is key**
   Skills development benefits everyone, but the evidence is much stronger for character skills making a big difference in the lives of disadvantaged children. This is because "atypical environments" don't provide the context to develop skills that "normal developmental encounters" do.
3. **Investing in the right skills makes all the difference**
   Skills that are malleable (can be changed through interventions), fundamental for later success, and unlikely to develop eventually in the absence of an intervention are most important to develop. Self-regulation is an example of this kind of skill.
4. **Early Investment must be matched with on-going investment**
   Early investments are less effective "unless they are accompanied by subsequent investments in sufficiently high-quality schools and other environmental contexts in which development takes place." A greater focus on the "sustaining environments" after early investment will yield long-term benefits.
5. **Developing parenting skills and relationships more important than income**
   While income is an important factor in improving a broad array of outcomes and lack of sufficient resources can negatively impact parents' capacity, the importance of parenting and mentoring—the key relationships in children's lives—is relatively more important.
6. **Aligning concepts and practice leads to better results**
   Because the character skills field is conceptually very complex with no unifying framework like more mature knowledge areas, aligning evidence, definition, strategy, and evaluation is critical to working towards well-defined goals.
7. **The importance of evaluation**
   We can't afford character skills to be "a bandwagon with loose wheels," enthusiasm must not get ahead of the evidence. Many educational innovations have proven later to be ineffective "fads." It is important that that the evidence drives reform rather than intuition.

1. INTRODUCTION – SUCCESS IN SCHOOL AND LIFE

What do you want to be when you grow up? This well-worn question, usually directed at bright-eyed young things, is increasingly difficult to answer. Some say the question itself is redundant, such is the astonishing rate of change in today's economic and social climate.[3] Predictions about what the future of work looks like or whether robots will take all our jobs vary tremendously—the only certainty seems to be uncertainty. And while there are many possible answers to the question, it is critical our policy framework gives our children the best chance to be prepared for the future; to flourish and be all they can be.

There is a deep need to ensure we are setting them up for success. Most people will agree that success early on in life is about more than just doing well in tests. What academic tests don't necessarily capture is what we call "character skills" like perseverance, motivation and self-control. These skills are valued by employers in New Zealand and across the world, and due to the ever-increasing uncertainty of the future of work and the ever-expanding role of technology, the demand is only going to grow.

Performing well at school, we tend to think, will be enough to get a good job down the track. But there is strong evidence that factors other than early test scores or academic success influence future economic and social outcomes. These include: higher wages, less use of health and social services, and avoidance of the criminal justice system.[4] Character skills developed early in life predict future success in school, work, and life more generally at a similar rate to test scores, and in some cases, even better.[5] One academic calls these skills "the missing piece" in education.[6]

Take self-control, for example. Richie Poulton, founder and chief researcher of the world-leading Dunedin Multidisciplinary Health and Development Longitudinal Study of 1000 people over forty years, says "it could be argued that self-control is the *sine qua non* of the non-cognitive skills now regarded as key for life success."[7] Researchers found that "childhood self-control strongly predicts adult success, in people of high or low intelligence, in rich or poor."[8] Improvements here made a difference to future outcomes, even when factors like "the children's intelligence, social-class of origin, and early home environment as well as mistakes made as adolescents" where taken into consideration.

Character skills like this have broadly been overlooked in New Zealand. Some might think we are well-placed for the future of work, with New Zealand being ranked top-three in the world in the Economist Intelligence Unit's Educating for the Future Index.[9] But the Index, which tracks inputs like project-based learning, digital infrastructure, and cultural diversity doesn't capture some of the most important aspects of the future of work. It doesn't capture how our education system is, on average, struggling to give disadvantaged children the opportunities they need,[10] nor does it attend to the great potential that developing character skills can have in improving outcomes at school, workplace, and life more generally. "These kids might not be coming in [to work] with the soft skills that you'd expect," said Business NZ CEO Kirk Hope in response to the award, "but this report says we are not doing it any worse than anyone else and are doing it better than many."[11] Hope went on to say there was too much assessment overall, "not enough assessment of some of the key drivers of the workforce for the future such as critical thinking, problem solving and collaboration." Perhaps this is why we still see headlines like "1 in 5 kids leave school unequipped for workforce."[12]

Indeed, those facing disadvantage have the most to gain by developing character skills.[13] The failure to develop or transmit these skills has been shown to be one mechanism that allows poverty to be handed down from one generation to the next.[14] This paper follows our *Heart of Poverty* series, which explored the causes and consequences of poverty, and the policy directions that may make a difference. Sadly, many children are left behind without the chances that others have to succeed in school, work, and life. This is particularly true for Māori and Pasifika children, disproportionately susceptible to poverty and its consequences. We found that enhancing educational outcomes for disadvantaged children was key to breaking the intergenerational chains of poverty. This is an especially important challenge in New Zealand, where, when compared internationally, there is a strong relationship between a parent's socio-economic status and educational outcomes for their children.[15] "The difference between students at the top and the bottom is deeply entrenched," said a top Ministry of Education official interviewed for the piece, "We've barely nudged it in 20 years."[16] In other words, we could do a lot better

to make our education and training system work for those who need it most. We must continue with existing poverty-fighting measures but it also means doing things differently—focusing on improving character skills alongside academic performance.

Governments across the world have policy statements committing them to developing character skills,[17] and there is an opportunity here for New Zealand to lead the world in this field. We are already thinking about the potential gains. Hon Grant Robertson, Minister of Finance in the Labour-led Government, signaled that "[w]e need to prepare by getting our education and training system to focus on giving skills that people will need for work and preparing the young people for jobs that don't exist yet,"[18] and National outlined their plans to improve character skills like self-regulation in a policy discussion document.[19] With significant reforms underway in the vocational sector, industrial policy and education, it is important that these skills are considered throughout.

The policy environment creates an important foundation, but it takes more than government to support the development of these skills. While many of them are best and most effectively developed in the early years and adolescence, there is good evidence that they can be developed all across the life-course—it's never too late. Subsequently, all parts of society have a role to play here, including parents, schools, community organisations, and policy-makers. This paper will explore the evidence to make sure we engage well.

The value of character skills in the workplace will only be amplified by technological changes. With the future of work comes not only disruption to the workforce, which we must prepare for, but an opportunity to shift towards work that truly harnesses the distinct qualities and potential we hold as humans. While the evidence is strong that these skills are associated with better outcomes in the future, it is mixed when it comes to whether interventions aimed at improving them are effective. The reality is we need more New Zealand specific research; it's important not to jump the gun with unproven policies. There is, however, good reason to keep exploring how becoming a character-building nation could hold the key to unlocking great potential in the lives of New Zealanders—especially those on the margins.

In this paper, we first explore the nature of character skills, what they are, how we can define and categorise them, and why we chose a particular understanding of them. We then turn our gaze to the workplace, looking at the current demand for character skills in the economy, what the future of work will likely look like, and which kinds of skills will be most sought after. Having made the case for the value of these skills, we then turn to the empirical evidence around the extent they can be developed and which kinds of interventions are most effective. We round out the paper with a series of principles and policies aimed at re-imagining our education, training, and development environment toward a skills system that is fit-for-purpose and for the future. *

2. CHARACTER SKILLS – DEFINITION AND MODELS

While interest in what we've been calling character skills has grown exponentially over the past decade,[20] as a concept they have proven hard to pin down. Professor of Education at Harvard Graduate School of Education, Martin West, says that those in the field are "basically... trying to explain student success educationally or in the labor market with skills not directly measured by standardized tests."[21] This loose definition goes some way towards clarifying meaning, but rather than saying what these skills *are*, it says what they *aren't*. We will now turn toward a more positive definition.

2.1. A definitional jungle

This field is particularly fraught when it comes to definition and terminology. One academic called it a "jingle jangle jungle," [22] referring to jingle fallacies where different things are called the same name and jangle fallacies where one thing is called different names.[23] The jungle metaphor is apt too, for the literature is dense, tangled, and difficult to navigate. In a similar vein, Knight & Page call them "wicked competencies," because it is "difficult to define them...[and] they can assume different forms in different contexts and they keep developing along the entire lifetime."[24] Complicating matters, different disciplines tend to use different terminologies:[25]

* Note: This paper was drafted prior to the Covid-19 Pandemic. The research and findings herein have not been made irrelevant, and in fact, are likely even more pertinent as home environments become more stressful, schools play catch-up, and the job market increasingly precarious. New Zealanders with these skills will be better equipped to face uncertainty. The rate of technological change is unlikely to drastically change following Covid-19, and if anything, will slow down.

Table 1: Relationship between non-cognitive skills and psychological personality traits

Conscientiousness	Agreeableness	Emotional Stability	Openness	Extraversion
Dependability	Collaboration	Confidence	Creativity	Assertiveness
Grit	Collegiality	Coping with stress	Curiosity	Cheerfulness
Organisation	Generosity	Moderation	Global awareness	Communication
Persistence	Honesty	Resilience	Growth mindset	Friendliness
Planning	Integrity	Self-consciousness	Imagination	Leadership
Punctuality	Kindness	Self-esteem	Innovation	Liveliness
Responsibility	Trustworthiness	Self-regulation	Tolerance	Sociability

Source: Richard Roberts, J. Martin, and Gabriel Olaru, "A Rosetta Stone for noncognitive skills: Understanding, assessing, and enhancing noncognitive skills in primary and secondary education" (2015), 10.

- *Economists* refer to ***Non-Cognitive skills***;
- *Psychologists* to ***Personality Traits***;
- *Educationalists* to ***Social and Emotional Skills/ Learning***;[26]
- *Futurists* to ***21st Century Skills***;
- *Business leaders to* **Soft Skills**; and
- *Philosophers* to **Character Virtues**.

Each tradition has a distinct focus, but there is also significant overlap with the concepts.* Table 1 offers an example of different fields seeking to describe the same phenomena, showing how the "Big Five" psychological personality traits, developed and now well-accepted after over a century of research, can be mapped against the more recently explored economic non-cognitive skills. The personality trait conscientiousness, for example, aligns with non-cognitive skills of grit, persistence, and dependability.

Alongside the difference in disciplines, there is also a lot of names for these things: Skills; Mindsets; Attributes; Competencies; Traits; Strengths; Behaviours; Progressions; Virtues; Constructs; Abilities; Dimensions; Feelings; Attitudes; Strategies; and Habits.[27] Each concept has distinct emphasis, for example, skills and learning speak of growth and development, while traits and attributes suggest they are immutable. But despite this complexity, researchers, decision-makers, and practitioners must cut through to make sense of it.

2.2. Bringing unity to a diverse set of models – Harvard "Explore SEL"

Seeing the need to bring some order to the chaos of defining and organising character skills, the EASEL (Ecological Approaches to Social Emotional Learning) Lab at the Harvard Graduate School analysed around 40 models of Social and Emotional Learning and systematically categorised the related concepts into the following six domains, listed in Table 2 overleaf.[28]

The EASEL domains represent the vast spectrum of skills, values, perspectives, and competencies that constitute what we are calling character skills.

* We are using the term character skills for this report, but the terms soft skills, non-cognitive skills, and social and emotional learning will be used interchangeably depending on the source.

Table 2: EASEL Social and Emotional Domains

Domain	Description	Examples
Cognitive Domain	The Cognitive domain includes the basic cognitive skills required to direct behavior toward the attainment of a goal. Skills in this domain are involved in tasks that require you to concentrate and focus, remember instructions, prioritize tasks, control impulses, set and achieve goals, use information to make decisions, and more.	Specific skills in this area include: Attention Control, Working Memory & Planning, Inhibitory Control, Cognitive Flexibility, and Critical Thinking.
Emotion Domain	The Emotion domain includes skills that help you recognise, express, and control your emotions as well as understand and empathize with others. Skills in this domain are important not only for managing your own feelings and behavior, but also for interacting with and responding to others in prosocial ways.	Specific skills in this area include: Emotion Knowledge & Expression, Emotion & Behavior Regulation, and Empathy & Perspective-taking
Social Domain	The Social domain includes skills that help you accurately interpret other people's behavior, effectively navigate social situations, and interact positively with others. Skills in this domain are required to work collaboratively, solve social problems, build positive relationships, and coexist peacefully with others.	Specific skills in this area include: Understanding Social Cues, Conflict Resolution & Social Problem-solving, and Prosocial & Cooperative Behavior
Values	Values includes the skills, character traits/virtues, and habits that support you to be a prosocial and productive member of a particular community. It encompasses understanding, caring about, and acting upon core ethical values; the desire to perform to one's highest potential; and the habits required to live and work together with others as a friend, family member, and citizen.	Specific values in this area include: Ethical Values, Performance Values, Intellectual Values, and Civic Values
Perspective	Your perspective is how you view and approach the world. It impacts how you see yourself, others, and your own circumstances and influences how you interpret and approach challenges in your daily life. A positive perspective can help you protect against and manage negative feelings to successfully accomplish tasks and get along with others.	Specific perspectives in this area include: Optimism, Gratitude, Openness, and Enthusiasm/Zest
Identity	Identity encompasses how you understand and perceive yourself and your abilities. It includes your knowledge and beliefs about yourself, including your ability to learn and grow. When you feel good about yourself; sure of your place in the world; and confident in your ability to learn, grow, and overcome obstacles, it becomes easier to cope with challenges and build positive relationships.	Specific competencies in this area include: Self-knowledge, Purpose, Self-efficacy & Growth Mindset, and Self-esteem

Source: Stephanie Jones et al., *Explore SEL*, http://exploresel.gse.harvard.edu/.

2.3. A model of character – towards flourishing individuals and society

We will be using the term character skills throughout this paper,[29] for several reasons:

1. Character draws on a rich philosophical tradition
2. People tend to be familiar with the term, even if they have different conceptions of what it means
3. It can encompass more than just instrumental skills but on the whole person
4. The term skills reflect the fact they are, to some extent, malleable and can be developed
5. Other terms can be too restrictive, for example, prominent academics decry the term non-cognitive skills because "few aspects of human behavior are devoid of cognition."[30]

2.4. Character has a rich philosophical, political, and cultural foundation

While not using character-specific language, there are rich Aotearoa New Zealand-specific parallels in te ao Māori.[31] Researchers Huia Tomlins-Jahnke and James Graham note that "Māori thought processes and intangible features, including the social dimension (whanaungatanga) and the emotional dimension (te whatumanawa) to nurture the learning process, and ultimately the well-being and quality of life that are bound to SEL [social-emotional learning]."[32] Māori Studies Professor Mason Durie's Te Whare Tapa Whā model clearly represents this holistic view of wellbeing (hauora)—the four walls of taha wairua (spiritual); taha hinengaro (mental and emotional); taha tinana (physical); and taha whānau (family and social) all needed for a flourishing life. There is good potential for exploring the overlap between kaupapa Māori and the traditions below, for as Durie said, "[a]rising from the creative potential of indigenous knowledge is the prospect that it can be applied to modern times in parallel with other knowledge systems."[33] What is not generally considered in other models, for example, is the central role that culture and language play in forming identity and promoting wellbeing for Māori, as Māori Research Professor Angus Macfarlane has outlined.[34]

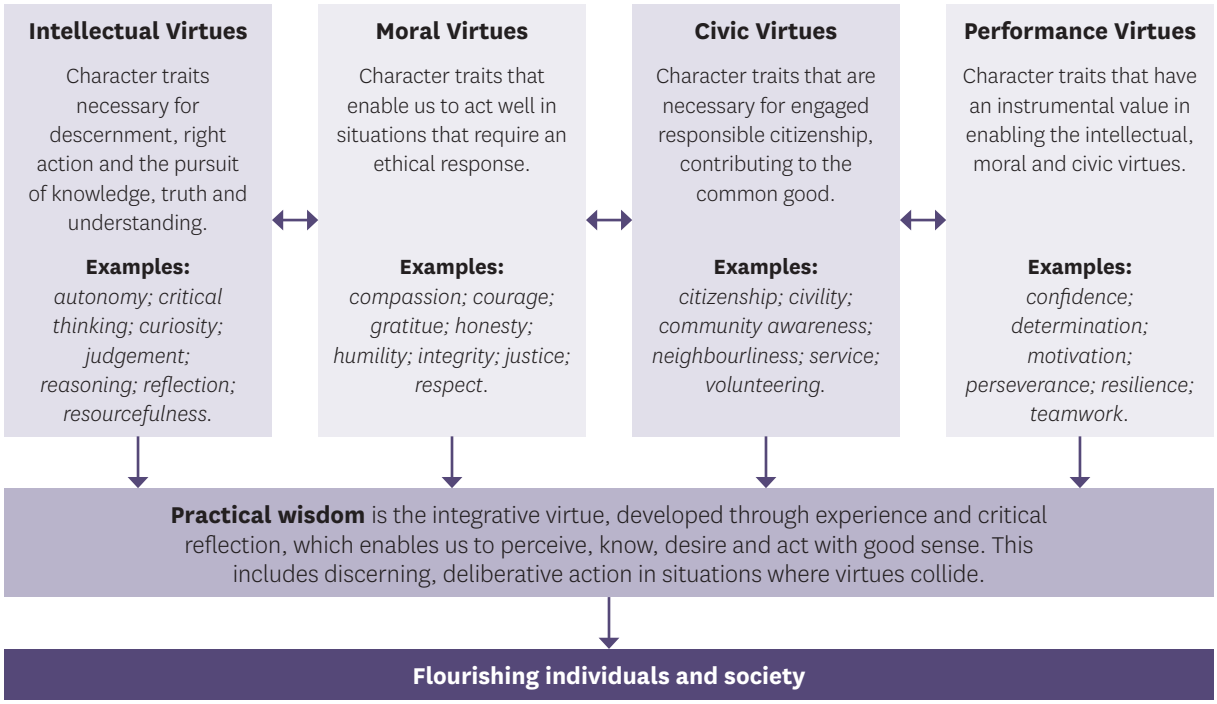
Part of this knowledge system is the western philosophical tradition. While the term "character" tends to be associated with religious or moral traditions, there is also a strong philosophical basis that goes right back to Athens—the modern form known as virtue ethics/theory. A focus on human flourishing, what Aristotle called *eudaimonia*, is at the core of what it means to develop character. Aristotle claimed that pursuing virtues wasn't just an instrumental means to another end like an individual's happiness for example, but a good in and of itself.[35] The modern form of virtue ethics was popularised by philosopher Elizabeth Anscombe's 1958 article that argued "an action is right not because it can be universalized in light of a rationalist principal (Kantianism) or because it makes the greatest number of people happy (utilitarianism), but because it enhances virtue and contributes to a flourishing life—as opposed to languishing or floundering one."[36]

A concern for character is not limited to one side of the political spectrum either. Conservatives like Edmund Burke were concerned about how a lack of self-control would endanger an ordered society.[37] Liberals, like J. S Mill, thought that a flourishing society must comprise of individuals with well-developed character as he was concerned that nations would fall prey to demagogues otherwise.[38] Philosopher Martha Nussbaum argued that a society-wide adoption of virtue ethics would result in "progressive" outcomes.[39] As we will see, it also takes character skills to pursue a life of one's choosing—a key foundation of a liberal society. Different perspectives come at it from different angles, but a concern for flourishing is held by all. A distinct Aotearoa New Zealand perspective on character must weave these cultural, political, and philosophical perspectives together.

2.5. The importance of a holistic perspective and human flourishing

Character skills are sometimes referred to as "essential" or "foundational," for good reason. They are not simply a feather in the cap after attaining economic success. The overall aim of character development, according to the Jubilee Centre for Character and Virtues at the University of Birmingham is "not only to make individuals better persons but to create the social and institutional conditions within which all human beings can flourish." Flourishing is not just about being happy, but to "fulfil one's potential," where acquiring and developing

Figure 1: The "Building Blocks of Character" Model – Jubilee Centre[40]



Source: The Jubilee Centre for Character and Virtues, "A Framework for Character Education in Schools" (2017), 5.

Intellectual, Moral, Civic virtues, enabled by Performance virtues leads to a robust democracy, strong economy and vibrant communities. It is also not just an individualistic endeavor, people need the right conditions to cultivate these skills. See Figure 1 above for Jubilee's model describing these virtues and their inter-relationships, what they call the "Building Blocks of Character."

2.6. Performance virtues verses moral virtues

Here we see how flourishing for individuals and society is the result of a combination of moral, performance, intellectual, and civic virtues; all filtered through the "integrative virtue" of Practical Wisdom (what Aristotle called *Phronesis*).[41] What this highlights is that a holistic perspective is important, and ignoring one set of virtues is likely to result in a failure to flourish. When it comes to discussing employment and education outcomes in particular (as we will do below), there is a great risk in defining "success" based solely on intellectual or performance virtues at the expense of moral and civic.

Promoting performance virtues without their moral, social, and civic counterparts is problematic. From controversial world leaders to disreputable bankers, the moral aspect of character is hard to deny but often forgotten, purposely ignored or conveniently put out of scope in discussions about success.[42] Character must be grounded in some sense of "the good," not simply on "what works." Psychologist Angela Duckworth, author of the best-selling book *Grit*, acknowledged that just focusing on performance virtues without a sense of the moral could result in what she called "gritty villains." Duckworth wrote the following about her children:

> *"Do I want them to be great at whatever they do? Absolutely. But greatness and goodness are different, and if forced to choose, I'd put goodness first. As a psychologist, I can confirm that grit is far from the only—or even the most important—aspect of a person's character. In fact, in studies of how people size up others, morality trumps all other aspects of character in importance... There are many other things a person needs to grow and flourish. Character is plural."*[43]

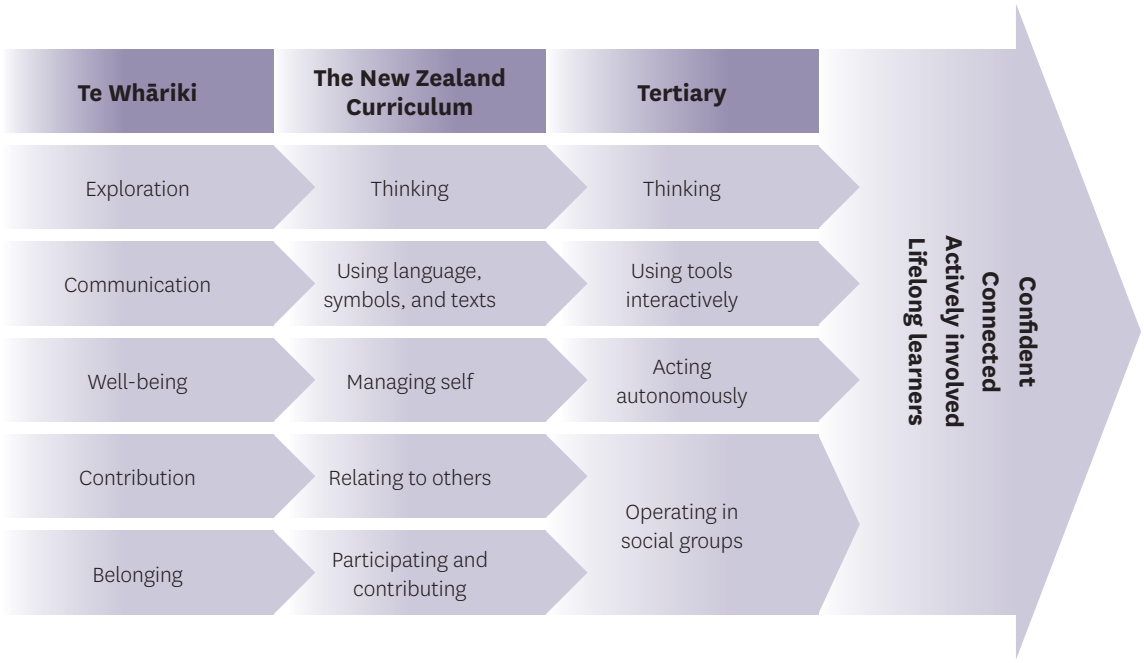
In his book *The Road to Character*, author and New York Times columnist David Brooks argues that instead of this "plural" sense of character that Duckworth describes, when we hear character today it is more often use in the self-interested, "greatness" sense.[44] "It is used less to describe traits like selflessness, generosity, self-sacrifice,

and other qualities that sometimes make *worldly success* less likely," says Brooks, and "instead, it is used to describe traits like self-control, grit, resilience, and tenacity, qualities that make worldly success more likely."[45] Brooks argues that more time is spent building "external career" success rather than "inner character." In a re-framing of performance versus moral virtues, Brooks outlines two distinct kinds of character: resume and eulogy virtues. Resume virtues are the more "worldly" skills that get people hired and climbing up the career ladder, while eulogy virtues are those that people are remembered for and would be spoken of at one's funeral—"whether you were kind, brave, honest or faithful…[w]ere you capable of deep love?"[46] The distinction isn't clear-cut however, for many of the skills valued in the workplace are, to a great extent, valued in broader life too, for "the person with the moving eulogy likely had [an] impressive resume."[47]

Overlap with The New Zealand educational system's Key Competencies

Figure 2 shows how the New Zealand Curriculum's Key Competencies align across the life course, from Te Whāriki (early childhood learning) through to Tertiary Education.[49] There is significant resonance with some of the character skills described thus far, including communication, managing self, and relating to others. We also see how moral and civic virtues are outlined: participation, contribution, and belonging to society.

Figure 2: The key competencies: Cross-sector alignment:



These competencies are a core part of working towards the Ministry's vision of young people as confident, connected, actively involved, and lifelong learners, and are "not just for school but for life."[50] Rather than "just something new bolted on to the rest of what kids need to learn and do," the Key Competencies are "are woven through all the learning areas of the curriculum and they signal a different approach to how students and teachers might go about their work."[51] Educational researchers are exploring how best to integrate the Competencies into learning practices.[52] This framework, if built upon, provides potential for character skills alongside the academic in the New Zealand educational system.

Source: Ministry of Education, "The New Zealand Curriculum" (2007), 42.

The KIPP (Knowledge is Power Program) Charter Schools in the United States also reflect this moral dimension with their seven character strengths: grit, zest, optimism, self-control, gratitude, social intelligence, and curiosity. "We're not religious, we're not talking about ethics, we're not going to give any kind of doctrine about what is right from wrong," says Leyla Bravo-Willey of KIPP Infinity in Harlem, "but there are some fundamental things that make people really great citizens, which usually include being kind."[48] While kindness is arguably a moral concept, there is concern here for these skills to help children become better citizens and community members.

2.7. Focus on performance virtues – improving outcomes and social mobility

But nonetheless, given the focus of this paper to improve educational and employment outcomes, particularly for the disadvantaged, we will be focusing primarily on performance (or resume) virtues when we talk about character skills. In doing so, we take seriously critiques by people like Anne Snyder, who argue that "a lot of character work out there is 'we just need to pull kids out of poverty and teach them some soft skills,' where character formation is a means to an end and all about getting them to a broader success ethic."[53] A more narrow focus does not mean losing sight of the bigger picture.

2.8. Developing character in a liberal society

One rationale for our focus on performance virtues is the way they help support and sustain a liberal, pluralist society. Today, we live in a pluralist nation strongly influenced by the tenets of modern liberalism—where each individual should have the greatest opportunity to pursue and shape a life they have reason to value.[54] With a greater breadth of skills comes a broader set of possibilities.[55] Jen Lexmond & Matt Grist, researchers at the Brookings Institute, articulate this vision here:

> *In a liberal society, the state has no business dictating to citizens how they should be in their personal lives beyond a framework of laws. But as this inquiry clearly establishes, much of people's personal lives…clearly contributes to entrenched disadvantage and discrimination. Where these choices and attitudes add up to limiting the freedom of individuals to shape their lives the state should certainly consider where and how to intervene. In many cases, it is voluntary and community organisations who are best placed to step in, but the funding and support structures that these organisations need to function must be made available.*

As they go on to say, "building character means building the capabilities that individuals need to pursue good and flourishing lives."[56] The formation of character skills, and performance virtues in particular, further the ends of a liberal society—not just for the interests of individuals but enriching the social and civic institutions they belong to as well. Improving individuals' economic and social mobility, job stability, decent wages, and avoiding poverty are all a function of character skills, and all are goals of a liberal society, "rely[ing] as heavily on individual character as much as the technocratic virtuosity of policymakers."[57] There are broader, less instrumental arguments for developing character skills, and one does not need to hold liberal values to support their development, but for now it is important to acknowledge that there is significant alignment with liberal values.

2.9. Societal structures matter – against an individualistic approach

Societal structures matter too. Developing character is not simply an individualistic approach, nor is it a veiled attempt at "fixing the poor."[58] The reality of societal constraints and barriers must be acknowledged. Nobel Prize-winning economist Professor Heckman goes so far to say that "poverty is not caused by a lack of character among the poor, but rather by society's failure to provide the proper resources and environments for developing character skills that promote success in life."[59] While Heckman's perspective here arguably discounts the role of personal agency, pretending that barriers don't exist and that it is all up to individuals and their families "betrays an individualist bias which unreasonably de-politicises the cultivation of character."[60] The realities of poverty and inequalities, for example, weigh heavily on many families and limit opportunities.

Both individual and structural factors matter. Sociologist Christian Smith argues that living a flourishing life is deeply dependent upon the relational context:

> *Humans deprived of access to life-enhancing institutional contexts (opportunities to participate in the right kinds of education, work, play, the arts, athletics, politics, community life, and such) will likewise be constrained in their quest for personal flourishing. Flourishing is never achieved in autonomous independence…but is radically developmentally dependent upon good social orders, on the right kind of social structures, for its realization. Furthermore, reciprocally, promoting good social orders is inescapably entailed in the pursuit of personal flourishing; seeking the common good is constitutionally part of seeking one's own personal good.*

Smith's call for reciprocal service towards seeking the common good—serving one another—leads us back to the necessity of considering moral and civic virtues outlined above as constituent of a flourishing life. Indeed, implicit in the use of the term character is that of being part of a shared story or narrative within a lived community; there are no isolated individuals.[61] Character skills, therefore, are dependent on both the individual and the context that shapes them.

2.10. Non-cognitive skills correlate with success later in life

Economists Samuel Bowles & Herbert Gintis first pointed out the importance of skills beyond intelligence and academic achievement for success in the workplace over 40 years ago, arguing that schools develop the characteristics that are valued in the (capitalist) marketplace—deference in workers and confidence in managers, for example.[62] They critiqued education as a way of reinforcing systemic inequalities, but since then, the study of non-cognitive skills has primarily been popularised by Professor James Heckman, who sees them as a way to break down inequalities. Heckman and others have found that there is solid evidence—primarily from economic and psychological literature—that non-cognitive skills are independently associated with success later in life.[63]

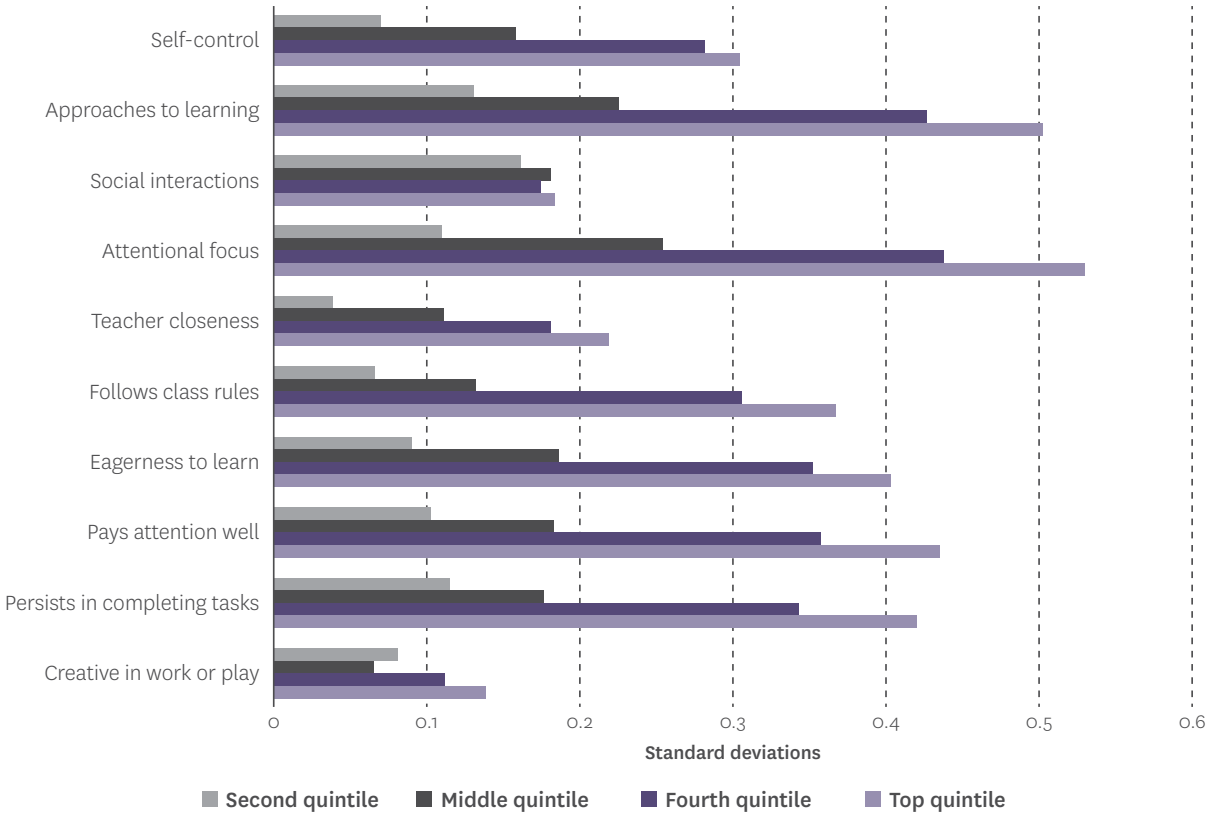
Non-cognitive skills have been overlooked in the academy and policy worlds. "Too much emphasis continues to be placed on one side of the human capital coin," said Heckman, "namely cognitive skills, variously equated with IQ and scores on achievement tests…to the detriment of character skills."[64] Using data from the Perry Preschool Program, a randomised trial that focused on 3-4 year-old low socio-economic and low IQ African American children, Heckman showed that "quality early childhood education programs for disadvantaged children can dramatically improve their future outcomes in education, employment, and health."[65] Heckman and colleagues also found that non-cognitive skills mattered more than cognitive skills for future labour market success (but less so for educational success).[66] Recent evidence from Australia and UK cohort studies supports this finding.[67]

Results from the longitudinal Competent Learners Study in New Zealand that followed the outcomes of Wellington-based children from around age 5 to 20 supports the importance of character skills. Students "with similar levels of literacy and mathematics had different success with qualifications," researchers found, and "what made the difference for those who gained NCEA Level 2 compared with those who gained NCEA Level 1, or those who gained some credits but no NCEA level, were their attitudes—the habits of perseverance, communication, curiosity, self-management…"[68] A Ministry of Education report concluded that these results highlighted how "teachers and parents played an important role in supporting children to achieve."[69]

There is a socio-economic gradient for non-cognitive skills. Children in poorer families are relatively disadvantaged when it comes to these skills. As we see in Figure 3 overleaf, there is a significant gap between the lowest quintile (the poorest 20 percent) and other quintiles. Given the relationship between character skills and future success, closing this gap is critical.

Non-cognitive skills explain differences in outcomes independent of socio-economic background. Evidence from the Dunedin Study found that children with relatively low self-control went on to have "poorer health; more wealth problems; more single-parent child rearing; and more criminal convictions than those with high self-control."[70] This result was after "children's intelligence, social class, and home lives of their families" were held constant, "singling out self-control as a clear target for intervention policy."[71]

Figure 3: Socio-economic gradient of various non-cognitive skills



Source: Emma Garcia, "The Need to Address Noncognitive Skills in the Education Policy Agenda," (2014), https://www.epi.org/publication/the-need-to-address-noncognitive-skills-in-the-education-policy-agenda/. Note from authors: "The reference category is the bottom socioeconomic quintile."

2.11. A thin but valuable conception of character

There is more to developing character than just personal success narrowly defined as getting a decent job and with enough income to get by. But as we are focusing on improving outcomes for people in or at risk of poverty in our society, limiting the scope in this paper to a "thin" conception of "performance virtues" is a necessary step. We maintain, nonetheless, that it is critical not to lose sight of the proper place of performance virtues—next to and reliant upon the moral, intellectual, and civic virtues, tending towards a more comprehensive overall goal of flourishing. Having examined what character skills are, we now turn to their relationship with the workplace of today and of the future.

3. CHARACTER SKILLS ARE INCREASINGLY VALUABLE IN THE WORKPLACE TODAY AND IN THE FUTURE

All across the world, employers are increasingly demanding and rewarding character skills when seeking out prospective employees. Over 92 percent of executives surveyed in 2016 by the Wall Street Journal, for example, said "soft skills were equally important or more important than technical skills."[72] The growing body of research shows how developing these skills provides a good return in the labour market for employees with respect to wages, and for employers with an increase in productivity.[73]

In New Zealand, employers and HR organisations increasingly reference to character skills when looking to the future.[74] "Employers will continue to require emotionally intelligent workers, who could collaborate, innovate, work in teams and bring people together into a team," said a representative of a recruitment association, who believed they would "be the hot roles in the next 20 years."[75] The Auckland City Council is aiming to "develop skills and talent for the changing nature of work and lifelong achievement,"[76] and noted in a recent report that "the majority of 55 key Auckland employers expressed difficulties finding employees with adequate soft skills, as well as the technical expertise needed for the job. Many of these employers reported that soft skills have become the primary criteria in hiring."[77] A survey of around 350 New Zealand employers by Victoria University found that in just under a decade, academic achievement was no longer in the top 10 employability skills and written communication skills fell in relative priority, while analytical thinking, problem solving, work ethic and energy and enthusiasm rose significantly.[78]

Getting the right balance of skills is important for economic success at the macro level too. OECD estimates indicate that nations with the "right mix of cognitive and non-cognitive skills in line with firms' requirements will have 8% higher relative exports compared with countries that have an average skill mix; this relative export gap could be as large as 60% between countries that exhibit very large differences in their skills mixes."[79]

3.1. Business leaders struggle to find workers with character skills

But the gap between this demand for character skills and supply is stark, with 89 percent of the executives mentioned earlier, saying they struggled finding people with those skills.[80] They found it difficult regardless of age groups and experience, and believed it was reducing their productivity. Graduates don't seem to be work-ready, as one report revealed for example: "while 87% of recent graduates feel well prepared to hit the ground running after earning their diplomas, only half of hiring managers agree with them."[81] A survey of CEOs by PricewaterhouseCoopers found that "77% of respondents believe that the biggest threat to their businesses stems from underdeveloped soft skills."[82]

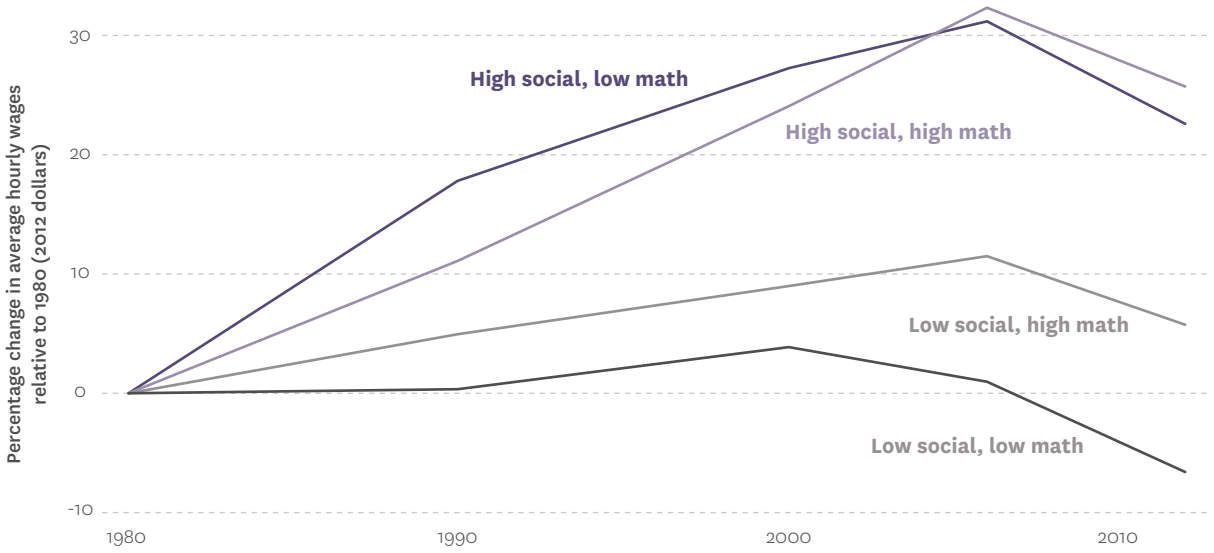
There are expectation gaps as well. Workers question how much their employers are preparing them for the future, with an Australian/New-Zealand-based survey finding that "ninety-one percent of employers believe they are providing support for workers to adapt to the coming change – but 43% of workers don't agree."[83] Despite growing evidence of the impact of technology on the future, and there is a sense of complacency in employers across Australia and New Zealand. [84] There needs to be a more serious and grounded discussion about how to prepare current and future employers for the future of work.

3.2. "Soft" skills are becoming more important for success in the workplace

The evidence behind the rise of importance of social skills is not confined to the mood of the boardroom, economists have shown there is good data supporting the trend. Harvard University Professor of Public Policy David Deming's work, for example, shows how the demand for jobs requiring social skills (the ability to work with others) has risen 24 percent—over twice as fast as those needing math/technical skills over three decades between 1980 and 2012.[85] This holds across the wage spectrum.[86]

Figure 4: Growing Importance of Social Skills[87]

Change in Real Wages by Occupational Skills, 1980-2012



Source: D. Deming, NBER Working Paper No. 21473

A combination of social and maths skills is ideal, but social skills are increasingly necessary in the workplace. While predominately-social jobs like lawyers or child-care workers have grown in market share,[88] the real and relative growth in demand is where technical and interpersonal skills meet—roles like doctors or computer scientists working in dynamic teams. What this data also shows is that jobs without a social requirement, even those that demand high maths and science skills, have lagged behind those needing social skills.

Another interesting shift involves the relative decline of payoff for STEM graduates that "high math" STEM-based jobs when compared with liberal arts graduates. As the New York Times headline of Prof. Deming's work puts it: "In the Salary Race, Engineers Sprint but English Majors Endure."[89] Using detailed job vacancy data, Deming found that while a computer science major might earn more for their first job, by the age of 40, the liberal arts graduate will likely have caught up. He theorises this relative STEM fadeout is for two reasons: firstly because technology is evolving so quickly that the sought-after technical skills become obsolete very quickly, and secondly, the ever-increasing number of recent graduates who've learned the updated technical skills at university get an advantage over older workers who have to update

Prof. David Deming on the long-term benefits of liberal arts

"Liberal arts advocates often argue that education should emphasize the development of the whole person, and that it is much broader than just job training. As an educator myself, I agree wholeheartedly. But even on narrow vocational grounds, a liberal arts education has enormous value because it builds a set of foundational capacities that will serve students well in a rapidly changing job market. To be clear, I am not suggesting that students should avoid majoring in STEM fields. STEM graduates still tend to have high earnings throughout their careers, and most colleges require all students — including STEM majors — to take liberal arts courses. But I do think we should be wary of the impulse to make college curriculums ever more technical and career focused. Rapid technological change makes the case for breadth even stronger. A four-year college degree should prepare students for the next 40 years of working life, and for a future that none of us can imagine."[92]

their skills on the job.[90] This data suggests that an over-emphasis on STEM subjects may only result in short-term gain due to the high churn of STEM-based work. Moreover, "...most STEM training will get students a good income at the starting gate and a decent career," writes author Christian Madsbjerg, "but powerful earners—the people running the show, breaking through the glass ceilings, and changing the world—tend to have liberal arts degrees."[91]

Technological change has been a significant driver for this shift. Before we explore the future of work, let's spend some time examining how this shift towards the social has taken place. Part of the answer lies in the relative decline of routine tasks versus non-routine tasks. In 2003, Economist David Autor and colleagues broke down jobs into particular tasks, distinguishing between routine and non-routine tasks. Table 3 shows this.

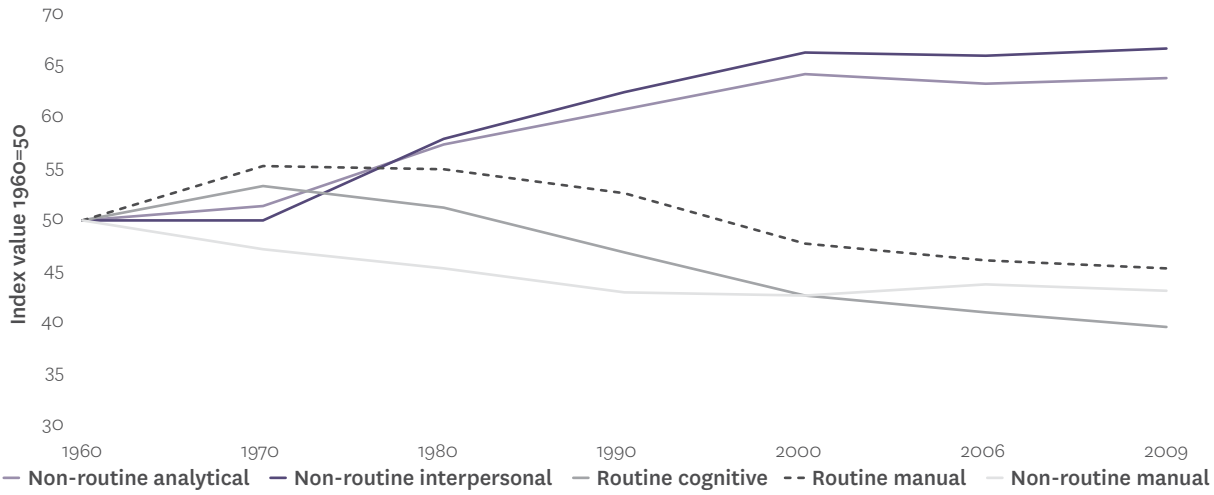
We see that non-routine tasks like writing and managing others are dynamic and difficult to codify or automate, and often involve social interaction and critical thinking. Jobs where the majority of tasks undertaken are like this have resisted the rise of technology and continue to grow, while roles that primarily rely on routine or predictable tasks have been much more susceptible to automation and other substitutes. Like the real wage changes in Deming's work, Autor's research (See Figure 5 below) shows how routine tasks have dwindled as a share of the economy when compared with non-routine. "Over the last three decades," writes Autor and colleagues, "computers have substituted for the calculating, coordinating, and communicating functions of bookkeepers, cashiers, telephone operators, and other handlers of repetitive information-processing tasks."[93]

Table 3: Employment effects of computerisation for routine and non-routine tasks

	Routine Tasks	Non-routine tasks
Analytic and interactive tasks		
Examples	· Record-keeping · Calculation · Repetitive customer service (e.g. bank teller)	· Forming/testing hypotheses · Medical diagnosis · Legal writing · Persusading/ selling · Managing others
Computer impact	· Substantial substitution	· Stong complementaries
Manual tasks		
Examples	· Picking or sorting · Repetitive assembly	· Janitorial services · Truck driving
Computer impact	· Substantial substitution	· Limited opportunities for substition or complementarity

Source: David Autor, Frank Levy, and Richard Murnane, "The skill content of recent technological change: An empirical exploration," The Quarterly journal of economics 118, no. 4 (2003)

Figure 5: Index of changing work tasks in the US economy, 1960–2009[94]



Source: David Autor and B. Price, "The changing task composition of the US labor market: an update of Autor, Levy and Murnane (2003)" (2013), cited in Productivity Commission, *New Zealand, technology and productivity: Technological change and the future of work* (2019), 26.

3.3. The fourth industrial revolution

The nature of our work is changing, and fast. Globalisation, technological progress and demographic changes are the "mega-trends" shaking up the future of the labour market.[95] The experience described in the previous section continues, and change in supply and demand of skills seems faster than ever. "A generation ago, the half-life of a skill was about 26 years, and that was the model for a career," said Indranil Roy, of Deloitte's Future of Work Centre of Excellence, "today, it's four and half years and dropping."[96] Researchers in Australia have estimated that a young person today could have up to 17 different jobs over 5 careers in their working life.[97] While the extent of these estimates could prove optimistic, they do point to a trend of greater uncertainty in the labour market.

The World Economic Forum claims we are in the "Fourth Industrial Revolution," a time of "great promise and great peril."[98] In a study of 46 countries and 800 occupations, McKinsey Global Institute found "that between 400 million and 800 million individuals could be displaced by automation and need to find new jobs by 2030 around the world," disrupting up to one-fifth of the global work force, meaning around one-third of workers in advanced economies may need to retrain.[99] While history has shown that previous revolutions have created new jobs—from farm to the factory, from the factory to the office—many claim this is an altogether new kind of revolution, not just more of the same. Futurist Martin Ford argues, for example, that while other revolutions have created jobs this one will be different because machines will be able to perform cognitive tasks as well as manual ones—white collar as well as blue collar.[100] It is only a matter of time, according to Ford and many others, when innovations such as artificial intelligence, cloud computing, and machine learning will replace much of what humans do now. We will discuss this question below.

3.4. Technology, automation, and the future of work

If headlines of job loss predictions are to be believed, it certainly is a time of peril. One particular study by Oxford University economists Carl Benedikt Frey and Michael Osborne has been particularly influential,[101] behind headlines like "Automation Could Wipe Out Half of All Jobs,"[102] and cited over 5000 times according to Google Scholar.[103] The authors estimate that "47 percent of total US employment is in the high risk category, meaning that associated occupations are potentially automatable over some unspecified number of years, perhaps a decade or two,"[104] fueling increasing concern about robots taking over the world of work as we know it. The timeframe of a few decades has only increased the urgency and fervour of the conversation.

Figure 6 overleaf graphs various estimations of future job losses due to automation. There is great divergence here on estimates, ranging from just under 10 percent all the way to over 50 percent, which highlights the difficulty of these kinds of predictions in a climate of uncertainty. One interesting trend from this data is how, on average, estimations of job losses have diminished over time.

3.5. Technological change is slower than most think

The influential study likely overstates the risk of automation. Different studies use different methodologies for their predictions, but most are based on the Frey & Osborne study, including the NZ-based study undertaken by NZIER in 2015.[105] It used occupation-based estimates, which assumes that entire jobs are at high risk if they had a large proportion of difficult-to-automate tasks. This methodology can overstate the case for automation-driven unemployment, as many of the high-risk jobs still contain a decent share of hard-to-automate tasks. By contrast, the comparative analysis in OECD's 2017 study used a task-based analysis and found the threat of joblessness more muted.[106]

Because jobs involve a combination of different kinds of tasks, the potential of automation is more limited than many suppose. Autor's research suggests that "many of the middle-skill jobs that persist in the future will combine routine technical tasks with the set of nonroutine tasks in which workers hold comparative advantage: interpersonal interaction, flexibility, adaptability, and problem solving."[107] The fact that the tasks in these jobs "cannot readily be unbundled" means that technology will more likely complement existing roles rather than replace them.[108] Developing these complementary skills that support technology use therefore becomes increasingly important.

Frey & Osbourne also ignore two very important considerations: adoption and cost. Their estimates rest on the assumption that if a job could be done by robots

it *will*.[109] There can be many years before an innovation shifts from technically possible to widely adopted—solar panels were invented in 1883 for example, over a century before they become more common.[110] McKinsey Global Institute say that "there is no evidence that technological adoption has yet accelerated over the last 60 years."[111] Similarly, an innovation can be technically possible but commercially unviable. It is worth noting that that Carl Benedikt Frey, who has been called an "accidental doom monger,"[112] claims that the paper doesn't estimate how many jobs will be replaced, only which professions are at risk. The actual automation figures, he argues, will come down to "cost, regulatory concerns, political pressure and social resistance."[113]

Jobs are not only destroyed but created too, what is sometimes called "creative destruction."[114] David Autor suggests that wages and productivity can both grow at the same time because robots don't just substitute for human workers, they also complement them.[115] Automation does tend to reduce employment and wages, but the net effect to the labour market is more complicated. Take agriculture, for example, where in the late nineteenth century, "mechanization reduced the labor share and employment in agriculture, [while] overall labor demand rose because a range of new tasks were introduced in both manufacturing and services."[116]

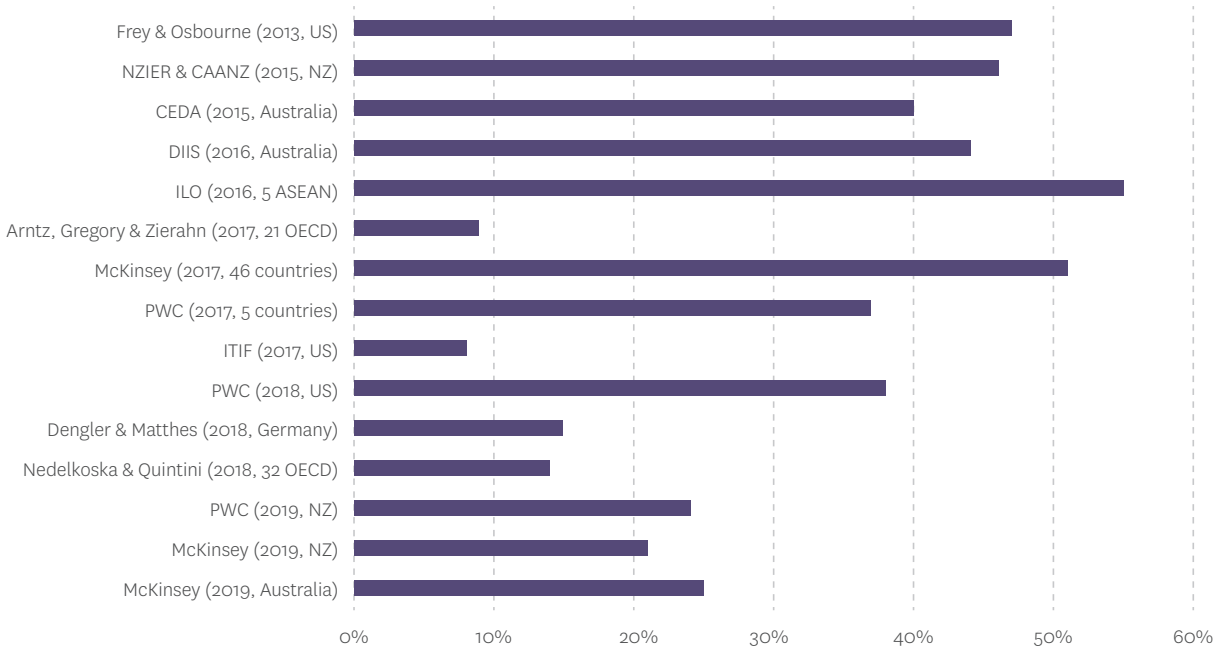
The advent of ATMs is another case where despite displacing many tellers, the productivity increase meant that in the US, banks opened 40 percent more branches over a decade—employing more tellers than before.[117] Technology doesn't just put people out of work, it creates new tasks where humans have comparative advantage too, and new tasks are what tends to drives growth in employment figures.[118]

3.6. Future of work, poverty, and inequality

Automation will disproportionally effect those more vulnerable and likely exacerbate economic inequality.[119] As MIT academics Eric Brynjolfsson & Andrew McAfee put it in their book, The Second Machine Age: [120]

> *Rapid and accelerating digitization is likely to bring economic rather than environmental disruption, stemming from the fact that as computers get more powerful, companies have less need for some kinds of workers. Technological progress is going to leave behind some people, perhaps even a lot of people, as it races ahead... there's never been a better time to be a worker with special skills or the right education, because these people can use technology to create and capture value. However, there's never been a worse time to be a worker with only 'ordinary'*

Figure 6: Job Automation Forecasts

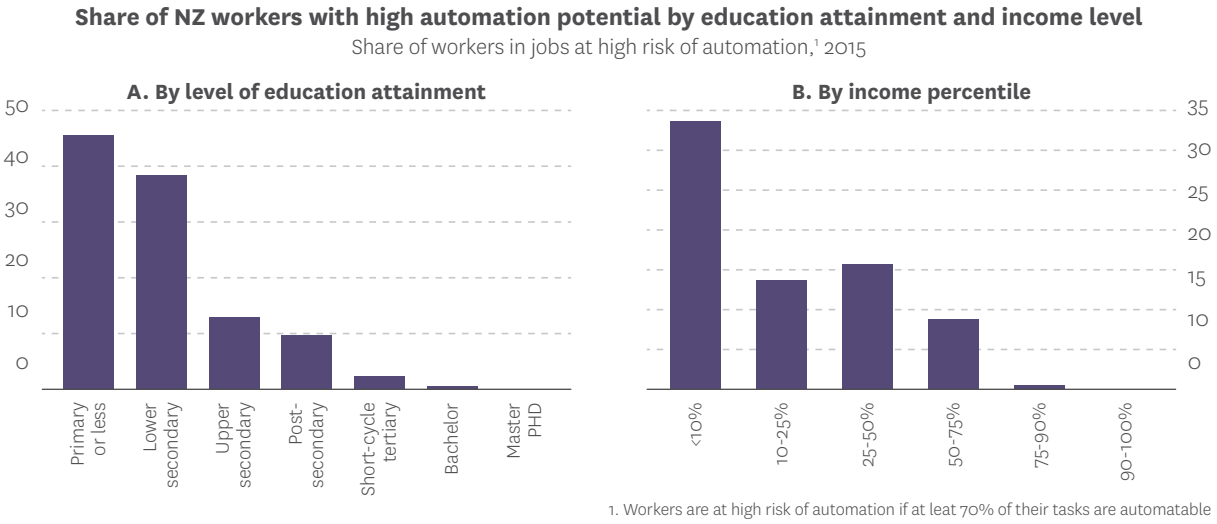


Source: Heatley (2019) https://www.productivity.govt.nz/blog/what-to-do-when-forecasts-diverge

skills and abilities to offer, because computers, robots, and other digital technologies are acquiring these skills and abilities at an extraordinary rate.

In many advanced counties, for example, we have seen a fall in real wages for non-college workers, even while there are fewer of them relative to other more educated workers.[121] We see this holds in New Zealand, with education levels strongly correlated with the share of workers at risk of automation according to the OECD (see Figure 7 below). Labourers, machinery operators and drivers, and clerical and administrative jobs—already at the lower end of the wage spectrum—are most susceptible to automation. This is extremely concerning, and the challenge is, as Oxford Economics put it, to "distribute the robotics dividend more evenly by helping vulnerable workers prepare for and adapt to the upheaval it will bring."[122] "Preparing for and responding to the social impacts of automation," they argue, "will be a defining challenge of the next decade."[123]

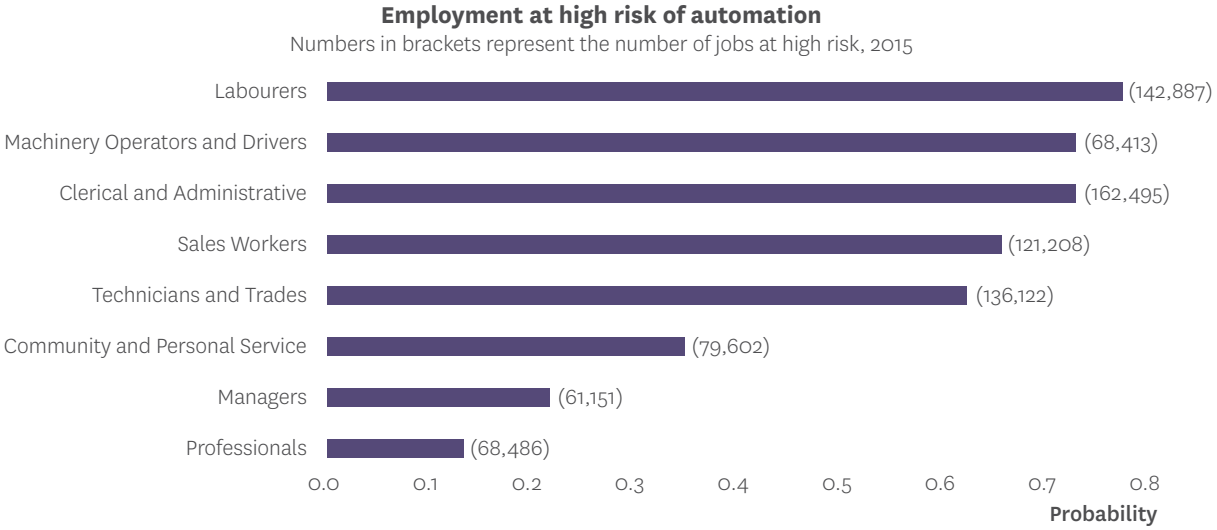
Figure 7: Automation and education levels



1. Workers are at high risk of automation if at leat 70% of their tasks are automatable

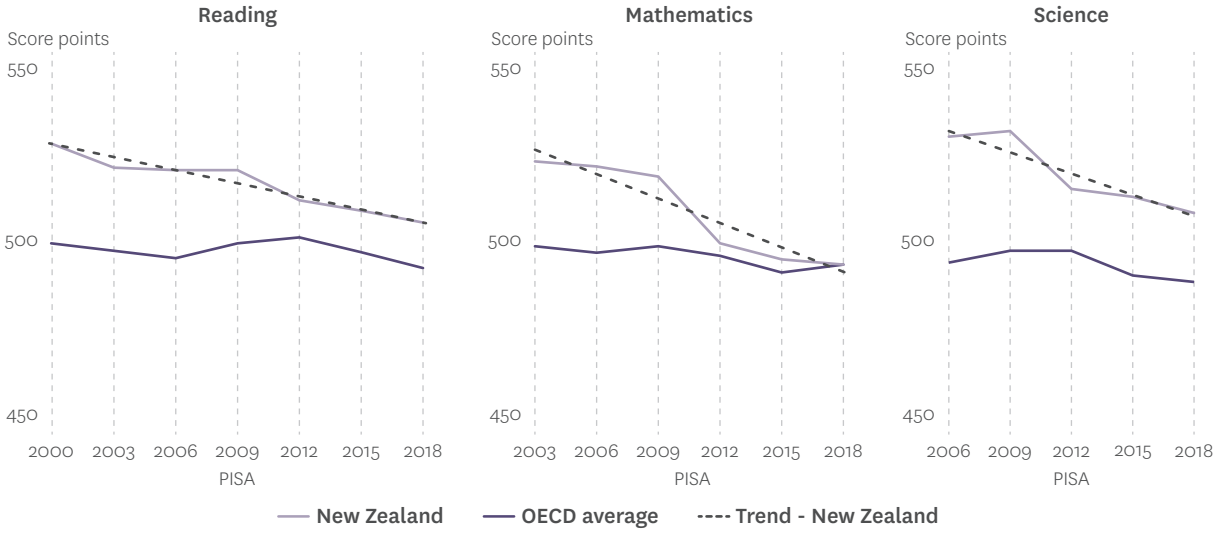
Source: David Carey, Adapting to the changing labour market in New Zealand, OECD Economics Department Working Papers No. 1420 (2017, 18.

Figure 8: Types of jobs at risk in New Zealand



Source: NZIER (2015), "Robot nation? The impact of Disruptive Technologies on Kiwis", *NZIER Insight*. 55-2015"

Figure 9: New Zealand PISA literacy, numeracy and science scores over time



Source: OECD, "PISA Results from 2018: New Zealand Country Report" (2019), 3.

3.7. New Zealand faces significant skills challenges

Education is part of this story, and is closely linked with inequality. Jan Tinbergen, Nobel Prize-winning economist, theorised that income inequality was the result of a "race between education and technology" where technological progress drives demand for higher skilled workers and education works on the supply side. The greater the inequality, the further ahead technology is likely to be in the race.[124] Our education system needs work to catch up.

While New Zealand is often considered a world-leading educational hub, we face significant challenges when compared internationally. Cognitive skills are on a steady decline. According to the OECD Skills Strategy Report, New Zealand is in the bottom 20 percent when it comes to improvements to youth skills, and the bottom 40 percent in improvements to the use of skills at work and alignment of skills with the labour market.[125] We are average in inclusive skills development, young adult's tertiary education attainment and skill levels of young tertiary educated adults. The key message in the OECD's Skills Strategy report: "the skills of young New Zealanders have not improved over time and are actually declining."[126]

Educational inequity is an ongoing problem in New Zealand. The 2018 PISA results on literacy, numeracy and science scores underscores New Zealand's long-term challenge to increase educational equity. "About one in five 15-year-olds are not at the level they need to be to function effectively in later life," said Dr Craig Jones, former Ministry of Education Deputy Secretary for Evidence, Data, and Knowledge, in response to the report's release.[127] "The difference between students at the top and the bottom is deeply entrenched. We've barely nudged it in 20 years." Perhaps a renewed vision of the future of work could make a difference.

Singapore education system widening focus from just cognitive skills

Singapore's education system is well-known for sitting top of the PISA (maths, science and reading) worldwide ranking. But alongside other East-Asian countries, it is now changing its focus: "We recognise the downside of an over-emphasis on grades and exams, and are taking steps to dial it back," says Ong Ye Kung, Singapore's Education Minister. This includes, he says, "changing the scoring system for schoolleaving exams, and enabling university admissions to be determined by more than just exam grades." (Economist Intelligence Unit, Educating the Future Index 2018)[128]

3.8. The human comparative advantage – what robots can't do

What is becoming clear is the distinctly human comparative advantage—for the foreseeable future at least, robots are no substitute for many tasks that humans are uniquely equipped. And while these kinds of tasks remain in demand there will be no mass unemployment.

David Deming puts it this way:

> *Social interaction is perhaps the most necessary workplace task for which there is currently no good machine substitute. Software exists that can manage investment portfolios, diagnose cancer and develop treatments for it, and beat humans in complex games such as chess, Go, and Jeopardy. Yet it has proven devilishly difficult to program a machine for even a short, unstructured conversation with a human being, much less to engage in the kind of flexible teamwork that is increasingly needed in the modern economy. The reason is that our ability to read and react to others is based on tacit knowledge that has evolved over thousands of years. It is difficult to reverse-engineer a process that we do not explicitly understand.*[129]

David Autor calls the Polanyi's Paradox, based on the economist and philosopher Michael Polanyi, who popularised the idea of "tacit knowledge" which is summed up in the phrase "We know more than we can tell."[130] Much of what we do as humans we can't explain, we only tacitly know the tasks we are engaging in.[131] This kind of knowledge, tasks that involve "flexibility, judgment, and common sense," is extremely difficult and very likely impossible to codify."[132]

More systematically, machines find it difficult to "engage" in the real world because of the complex structure in the environment, degrees of freedom in dexterous interactions, richness of perceptual information required to support completion of tasks, and cost.[133] As contexts become more complex, uniquely-human skills tend to become more valuable. Alongside the routine/non-routine distinction made earlier, a few other frameworks can help shed light on the kinds of work that are less susceptible to automation. Economist Robin Hogarth outlines the distinction between "wicked" and "kind" learning environments,[134] where wicked learning environments obscure any sense of cause-and-effect relationship between actions, and kind learning environments, where actions lead directly to predictable outcomes and judgments can be reliably made. Robots are not good at wicked environments. The Cynefin Framework is another that sorts environments based on the nature of the cause-and-effect relationship. The contexts range from simple, complicated, complex, and chaotic and require people "to diagnose situations and to act in contextually appropriate ways"—humans are better the more complex and chaotic the situation.[135] The rise and decline of autonomous vehicles is a good case study of this, with a recent MIT study concluding that the "variability and complexity of real-world driving conditions require levels of situational adaptability that current technologies have not yet mastered."[136]

Resilient jobs

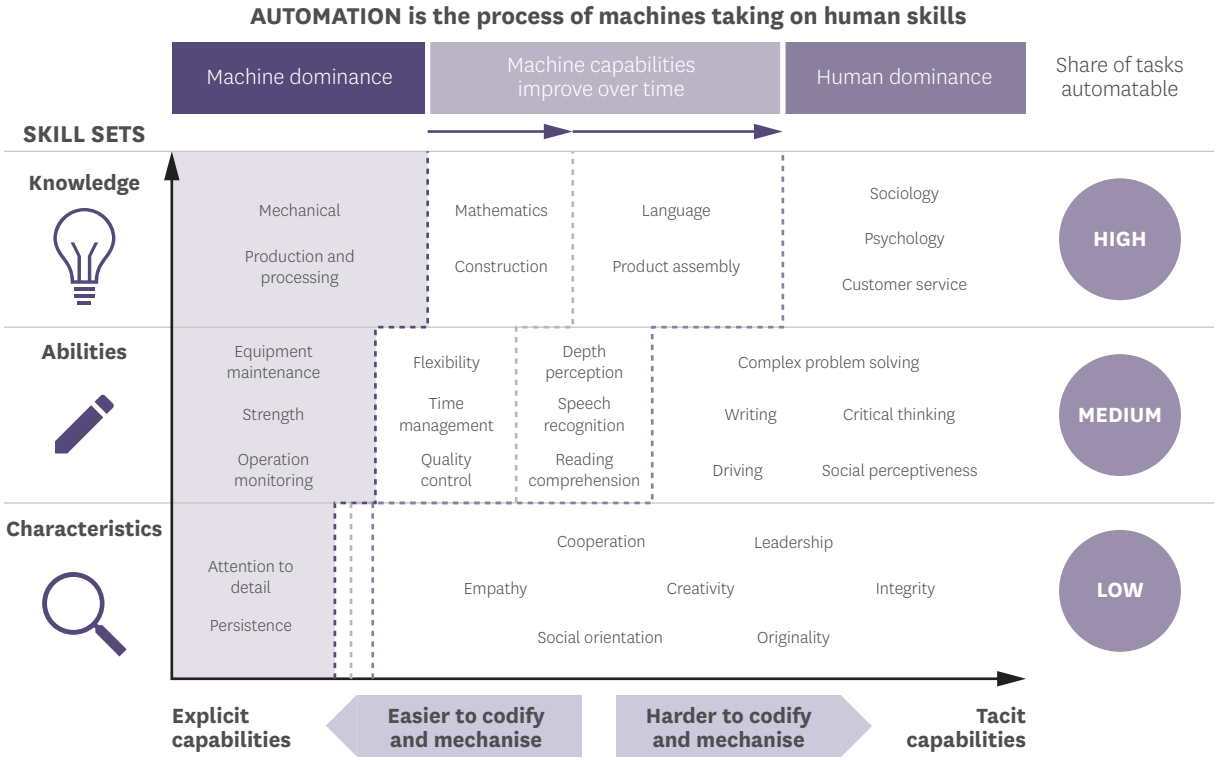
Some kinds of work will remain safer from automation. Osborne and Frey outline that Perception and Manipulation, Social Intelligence, and Creativity are barriers for automation.[137] Martin Ford thinks similarly with creativity and social relationships, but also adds jobs that are unpredictable to the list of resilient jobs. [138] They both add the caveat that robots cannot replicate these attributes *yet*, and that potentially technology like machine learning has been touted as a response to this. Long-term change is hotly debated, but even if a way is found for machines to learn these things, they are unlikely to do so anytime soon.[139]

Difficult-to-automate tasks are set to grow in demand. Australian researchers analysed over 500 skills, mapped them to tasks, and grouped them into three categories: knowledge, abilities and characteristics.[140]

- "Knowledge refers to the body of information that can be directly applied to the performance of a task, such as medicine, maths, language, architecture, and accounting;
- Abilities refers to an observable physical or mental competence, such as strength, design, listening, driving, time management or programming; and
- Characteristics refer to character attributes or attitudes that include integrity, leadership, persistence, empathy, and attention to detail, which also form an important part of the skill set needed to perform a task."

Figure 10 overleaf shows how these categories of skills interact with automation.

Figure 10: Automation and skills



Source: AlphaBeta, "Future Skills" (2018) 21.

In the Australian context, researchers predict that "distinctive human characteristics" will "become more than twice as important by 2040," and to keep up with changing technology, workers will need to spend twice as much time developing them than they currently are.[141] They also argued that people "are increasingly relying on distinctively human characteristics such as initiative, persistence or originality to do their jobs…In other words, 'characteristics' are overrepresented among the fastest growing skills across all job clusters, and this trend is expected to continue."[142]

So, according to the theory and evidence set out above, it is likely that the near future will not look too dissimilar to our world of work today. Workers will be displaced, but new jobs will be created too. The jobs that endure and those that are created will increasingly and disproportionately rely on character skills, meaning workers that have them will be disproportionately rewarded, and those who don't will fall further behind. This is not just a daunting project of re-skilling and up-skilling for the future but an exciting prospect, as the jobs valued in the future are also likely to be more meaningful and harness our distinctly human skills.

3.9. New Zealand-specific evidence

Much of the research cited thus far has been international, but how relevant are these predictions for New Zealand? Will our future be disrupted in the same way? What will the future of work look like *here*? New Zealand author Kinley Salmon thinks we should "take a deep breath about robots replacing us," in his book *Jobs, Robots & Us*, a counter-point to Silicon Valley futurists. Adding weight to the earlier argument that entire occupations are unlikely to be automated in the Frey & Osbourne studies, Salmon also outlines several distinctive features of the New Zealand economy that question the international automation narrative: low productivity, relatively small-sized firms, and relatively low rates of diffusion and slow adoption.

Firstly, our productivity is notoriously low. Productivity is in part a measure of how far new technologies have spread and how effectively it is being used, for when "a new technology shows up in productivity statistics it is already changing work in a variety of ways by enabling businesses to do more with less."[143] Compared to Australia, for example, we have fewer and worse quality machines,

which means our multi-factor productivity is low. What the Australian example does show us, however, is that as jobs are created through technology, "it is possible to have higher productivity without ending up with widespread unemployment."[144] Furthermore, in 2019, New Zealand also had the lowest unemployment rate in 11 years;[145] automation is not yet causing significant job losses.

Secondly, large-scale automation is difficult in New Zealand because we have a significant proportion of small and medium-sized firms where large investments in automation would not be cost-effective. Small and medium-sized firms make up 97 percent of New Zealand enterprises, 29 percent of workers, and 28 percent of GDP.[146]

Partly flowing from this, New Zealand is also challenged when it comes to technological adoption and diffusion—our firms are slow to adopt new technologies and getting relatively worse to comparable firms overseas as time goes on.[147] Salmon concludes, "we in New Zealand do not actually use that many of the machines, computers and robots that already exist and are used elsewhere. Technological change will continue, but if history is anything to go by, its arrival in New Zealand workplaces may be relatively slow and halting."[148]

Overall, compared with larger countries like the United States, New Zealand is less likely to face serious disruption in the near future: The New Zealand Productivity Commission, which recently released a draft report on "Technological change and the future of work," summarise the current state of play:[149]

1. "There is little evidence in the available data that widespread disruption to work is coming soon.
2. The likely pace and scale of technological change in New Zealand will depend to a significant extent on developments overseas.
3. Technology and labour-market trends in New Zealand tend to lag behind those overseas, and will be more muted, if recent history is anything to go by.
4. The main problem facing New Zealand today isn't too much technology, it's not enough. New Zealand needs to embrace technology, not treat it as a threat."

Analysis of NZ job advertisements shows "soft skills" are in high demand

A big data-based analysis of over one million New Zealand job advertisements sheds more light on what employers are currently seeking. This suggests that we should not consider skills in isolation, but "skill sets."[150] Cluster analysis shows what kinds of skills are transferrable. Rather than just lumping all who work in agriculture together in an industry, this cluster-based arrangement gives a more nuanced perspective. Take the example of the Tertiary Education Commissions typology in Table 4 below for example, farm managers are inventors, accountants are organisers; crop and livestock workers are operators; mechanics to fix things are crafters.[151] Each role involves both general and specialised skills.[152]

Table 4: Tertiary Education Commission: Six job clusters in New Zealand[153]

Cluster	Description	Example Jobs
Inventors	workers with strong technology, business, and problem-solving skills.	Solicitors, Scientists, Architects, Farm Managers, Construction Managers
Organisers	workers with service-oriented and administrative skills	Real Estate Agents, Event Organisers, Secretaries/ clerks, Accountants
Operators	workers with strong manual and communication skills, and a positive attitude.	Drivers, Brick Layers, Machine Operators, Farm workers
Engagers	workers with deep interpersonal skills needed in retail and hospitality	Waiters, Sales Assistants, Tour Guides
Crafters	workers with sophisticated industrial, technical and organisational skills	Mechanics, Aircraft Engineers, Boat Builders, Chefs
Healers	workers with caregiving expertise, and some administrative and corporate skills.	Medical Professionals, Social Workers, Pharmacists, Occupational Therapists, Aged Care Workers

Forecasting just a few years into the future to 2023, we see that while Inventors and Organisers are the biggest clusters now, Inventors and Healers are predicted to grow the fastest out of all the clusters (Figure 11 below).[154] These high-growth clusters both involve social skills and non-routine tasks, and align with Deming and Autor's above research. Operators and Crafters on the other hand, some of the lowest predicted growth clusters, exhibit tasks that are likely routine, and don't necessarily involve high social skills—again, ripe for automation.

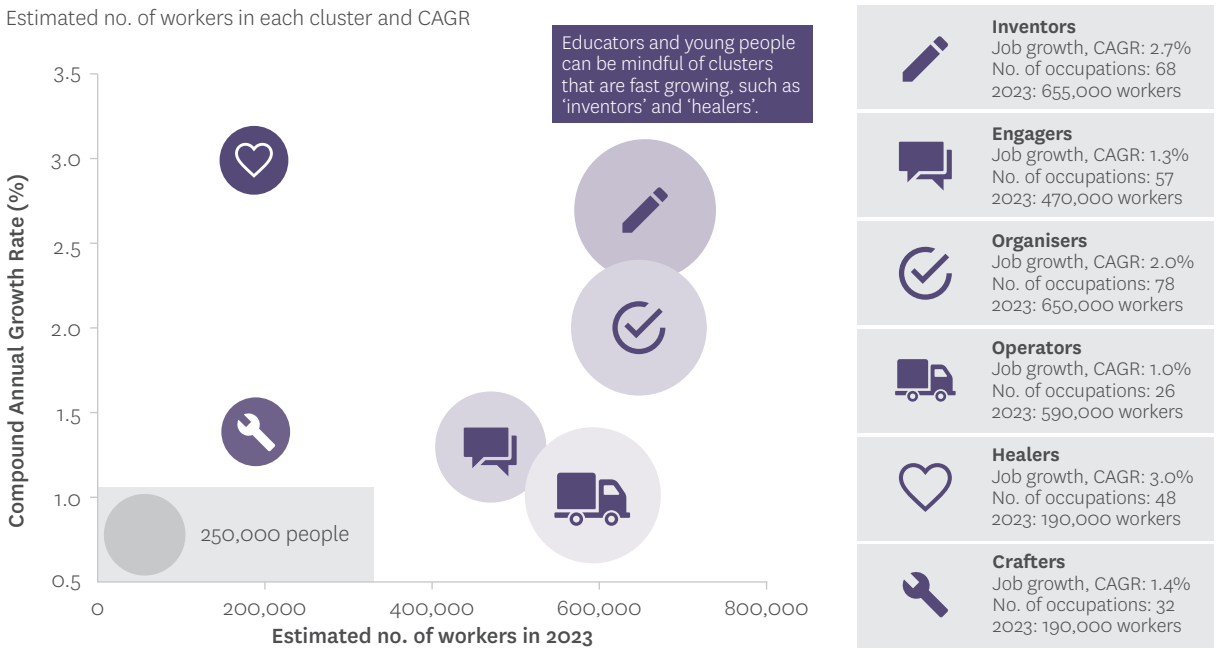
3.10. A hopeful future of work is in our hands

This is indeed a time of peril, but also of promise. There has been a "long history of leading thinkers overestimating the potential of new technologies to substitute for human labour and underestimating the potential to complement it."[155] In fact, there is good evidence that experts tend to be overly optimistic about how fast and disruptive technological change will be.[156] "[F]ears about permanent global job destruction generated by robots appear somewhat exaggerated," reports the Oxford Economics study, which "shows that the current wave of robotization tends to boost productivity and economic growth, generating new employment opportunities at a rate comparable to the pace of job destruction."[157]

Overall, the above analysis is important for poverty and inequality, for the demand for lower-skilled performing routine tasks will likely continue to decline, as employees favour those with more-developed character skills in a more dynamic work future. While this perspective suggests that we may have more time on our hands than we think to adjust to the change, change is still on the horizon. And besides an uncertain future, employers *today* are screaming for potential employees with the skills needed to succeed in today's economy. Many children growing up today are not getting the skills they need now, let alone for the future. We need to change how we educate, train, and develop.

There is significant merit to shifting debate from simply how many jobs will be lost, towards a deliberate and reasoned transition to a new world of work, one that holds opportunities to embrace the kinds of skills that make us most human. This can be a time where action is driven by hope rather than fear. We have agency to define the future, as Kinley Salmon says, "the future of work is in our hands and will largely depend on the policy decisions countries make."[158] This is not an alarmist call for radical change, but a measured and hopeful response to the realities of a changing world of work. We now turn to see what we can do about it.

Figure 11: Forecasted cluster sizes in 2023



Source: Tertiary Education Commission, "Hidden Links, New Opportunities" (2018), 23

4. CHARACTER SKILLS AND EDUCATIONAL AND WORK SUCCESS - EMPIRICAL EVIDENCE ON CHARACTER SKILLS DEVELOPMENT

Character skills are not only in demand now, but will be increasingly so in the future as well. With the rise of automation, artificial intelligence, and other technological advances, the case for developing these skills grows even stronger. We have seen how they contribute to success in the workplace and looked at the demand side—the numbers and kinds of jobs that will likely be available in the future—and now it is time to explore the supply side. It is one thing that character skills predict future outcomes and that the gap falls along socio-economic lines, but for this to be of particular policy interest, these skills must not only be changeable over time but also responsive to interventions.[159] To what extent can character skills be developed, if at all? If they can be developed, what kinds of interventions are most effective? It is still early days for the causal and intervention-based evidence, but there are many valuable insights with potential to influence policy.

4.1. Character skills, development, and causation

Harvard Professor of Child Health and Development Jack Shonkoff noted that "virtually every aspect of early human development, from the brain's evolving circuitry to the child's capacity for empathy, is affected by the environments and experiences that are encountered in a cumulative fashion, beginning in the prenatal period and extending throughout the early childhood years."[160]

Indeed, decades of research on the development of skills by economists, developmental psychologists, and, more recently, neuroscientists, have led to a confluence of evidence that supports a "striking convergence" on a set of "common principles:"[161]

1. Skills are interdependent and contribute to success in the workplace (*multiplicity of skills*)
2. Skills can develop over time at critical and sensitive periods
3. The brain develops through both experience and genetics
4. Skills build on earlier skills (*dynamic complementarities*)

4.1.1. Multiplicity of skills

Contrasting many popular books focused primarily on one factor like Growth Mindset or Grit, there is no one key to unlock better outcomes. Indeed, educational researchers Leslie Gutman & Professor Ingrid Schoon found that there is no one skill that is the "secret to success" above and beyond IQ or test scores, but "rather, many skills are inter-linked and the enhancement of one of these skills without improvement of the others is unlikely to lead to lasting changes...[and] when developed in combination, skills such as self-efficacy, motivation, and meta-cognitive strategies appear to be influential in improving academic learning and success in children and young people."[162]

We saw in Section 3 how character skills complement intelligence to contribute to success in the workplace. One interesting finding that drove interest in character skills was how cognitive skills developed in early childhood interventions tend to diminish over time, while non-cognitive skills improved outcomes years later.[163] In the US-based Perry Preschool program noted in Section 1, for example, the experiment group and the control group all went to the same school after the intervention, and data was collected to when they were 40 years-old. Participants saw an initial increase in IQ scores, but this faded relative to the control group by around age 10. Partly due to the programme's focus on developing character skills, however, the disadvantaged participants went on achieve better social and economic outcomes than the control group.[164] Additional US longitudinal research following early childhood program Head Start also saw similar results. Like the Perry research, the results indicated that the "long-term impact for disadvantaged children is large despite "fade-out" of test score gains."[165] Economic success is about more than just IQ or cognitive skills.

4.1.2. Skills can develop over the lifetime and have critical and sensitive periods

We also noted earlier that the use of the term skills rather than traits implies that these things are malleable—they can change over time. Even the psychological literature which tends to prefer traits language shows they are, to some extent, malleable. "[T]raits are not set in stone," concluded a review of the available research, "they change over the life cycle and can be enhanced by education, parenting, and environment to different degrees at different ages."[166]

Figure 12: Personality changes over life course

Source: Richard Roberts, J. Martin, and Gabriel Olaru, A Rosetta Stone for noncognitive skills: Understanding, assessing, and enhancing noncognitive skills in primary and secondary education (2015), 11.

Figure 12 above shows how rather than being static across lifetimes, personality traits, organised in the "Big Five" typology, change over time. These traits—agreeableness, emotional stability, openness, and social dominance—align with character skills, are empirically robust and predictive of future outcomes.[167] There is also good evidence from meta-analyses that personality is malleable—up to a full standard deviation in some cases.[168] This means that there is potential for policy to make a difference, and not just in the early years or primary school.

As we can see above, different skills have different degrees of malleability and this changes over time. Another evidence review found that self-control has low-to-medium malleability, more akin to a stable personality trait, while self-efficacy (an individual's belief about their capacity to perform) is more a highly malleable skill, for example.[169] For a comprehensive review of the quality of measurement, malleability, effect on other outcomes, and strength of evidence of these and other non-cognitive skills, see Appendix 1.

4.1.3. Critical and sensitive periods for development – early years and adolescence

There are times where skills are more likely to develop. Innovations in neuroscience over recent years have highlighted how the brain's plasticity changes over time, and that the early years and adolescence have emerged as the sensitive times to develop skills. The Center on the Developing Child at Harvard offers 5 key concepts when it comes to early brain development:[170]

1. The basic architecture of the brain is constructed through an ongoing process that begins before birth and continues into adulthood.
2. The interactive influences of genes and experience shape the developing brain.
3. The brain's capacity for change decreases with age.
4. Cognitive, emotional, and social capacities are inextricably intertwined throughout the life course.
5. Toxic stress damages developing brain architecture, which can lead to lifelong problems in learning, behavior, and physical and mental health.

Childhood—where "in the first few years of life, more than 1 million new neural connections are formed every second"—is an especially important time for building the foundations for future success in life and in the workplace. Evidence suggests that "at least 50 percent of the variability of lifetime earnings across persons is due to attributes of persons determined by age 18,"[171] for example. These years are indeed formative.

This influences the timing and nature of the interventions. Early childhood interventions promoting non-cognitive skill development tend to generally be more effective than interventions in adolescence.[172] Non-cognitive skills are also more likely to change as a result of an intervention later on in life than cognitive skills—in adolescence in particular.[173] Similarly, econometric studies have shown that while targeting those most disadvantaged in their early years is optimal from an investment perspective, "successful adolescent remediation strategies for disadvantaged children should focus on fostering noncognitive skills."[174] In early childhood and adolescence, these skills are ripe for development.

While more effective in the sensitive periods, there is good evidence suggesting that all is not lost in later years; remediation is possible. "Later stage remedial interventions are generally less effective," found Heckman & Mosso, "especially if they target IQ. Interventions aimed at disadvantaged adolescents can be effective if they target enhancement of noncognitive capabilities."[175] As part of the Dunedin Study, researchers found that programmes aimed at improving self-control, "were consistent with a "one-two punch" scheduling interventions during both early childhood and adolescence."[176] Part of the rationale for adolescent interventions is because this is where "life-altering mistakes" are from a lack of self-control are likely to be made, so preventing those mistakes has value.[177] There is some evidence that work-based programmes can be effective for helping adolescents develop skills they haven't acquired in their normal contexts, again, those disadvantaged in particular.[178] It is also possible that there are sensitive periods later in life, but it is much more difficult to test this empirically.

There is a strong caveat on the evidence about sensitive periods—that the evidence is much stronger when aimed at improving the lot of children from disadvantaged environments when compared with improving the outcomes of "normal functioning" children.[179] As Stephen Monsell puts it: "We have seen that the neural concept of the sensitive period emphasises the value of avoiding an atypical environment, but may not predict the same advantage again when normal development encounters an enriched environment."[180] This strengthens arguments for focusing policy on the disadvantaged.[181]

4.1.4. Nature and nurture – Environment and genes

The skills development equation includes environments and experiences on one side, and genetics and inheritance on the other. Behavioural economists have tended to subscribe to the view that skills development is more about situations than a stable personality; that incentives and constraints primarily govern peoples' actions.[182] But one study, for example, found that non-cognitive skills "tend to be about 30% – 60% heritable."[183] Furthermore, behavioural geneticists found that identical twins were more similar than fraternal twins when it came to self-control, suggesting that genetics plays a strong role, but also leaves room for the non-genetic factors to have a significant influence as well.[184]

Developmental psychologists have studied the interactive process between experience and genetics as children develop the "cognitive, social, and emotional capacities that are foundational for school achievement and adult economic productivity."[185] One way of describing this model is a "sociogenomic" one,[186] where personality traits are "relatively enduring patterns of thoughts, feelings, and behaviors that reflect the tendency to respond in certain ways under certain circumstances."[187] To add slight nuance to this synthesis, the stable aspect of personality is how people tend to respond similarly in similar situations—the "if-situation/then-behaviour" model.[188] Camille Farrington and colleagues put it this way:[189]

> *Even if one's innate tendency to persevere is hard to change, there is ample evidence that people can change the intensity, direction, and duration of their behaviors despite their personalities. In other words, whether or not a student has a gritty personality, he can learn to change the quality of his behavior—in effect to act perseverant even if that is not in his core nature.*

The growing field of epigenetics helps describe how the nature and nurture aspects develop together across generations and that "environmental influences are partly heritable."[190] Our genetic makeup is "rather like

a set of piano keys," explained epigeneticist Marcus Pembrey, "it provides a blue print for the type of music that can be played, but our environment and nurture determines what keys are pressed when, how hard, how long, and in what order."[191] But rather than being fixed, people's genetic code changes in response to the experiences and environment, and these changes can be passed down from one generation to the next.[192] An enriched childhood experience, then, can yield benefits not just for the child in question, but for their children too. This raises the stakes for the importance of critical periods of development.

4.1.5. Dynamic complementarity

Another core concept is that of dynamic complementarity, or in other words, that skills tend to build cumulatively on earlier skills and investments are made more productive by earlier ones. Heckman and colleagues summarise this in the phrase "skill begets skill,"[193] and argue for the importance of building a solid human capital foundation for children in the early years, allowing them to gain more from future investments.

Academics tested this thesis by looking at outcomes of children who had participated in an intervention to improve their school readiness (Head Start in this instance), followed with a greater spend on primary school to sustain the changes to test the cumulative aspect. Overall, they found "long-run benefits of public early childhood investments and robust evidence of complementarities between early and later human capital investments for low-income children... that early and sustained complementary investments in the skills of low-income children can be a cost-effective strategy to break the cycle of poverty." [194]

This evidence showed greater benefit for disadvantaged children too. For children from non-poor families, increasing primary school funding led to future improvements in educational and economic outcomes, while their participation in Head Start didn't make a significant difference. For children in poor households, however, both spending increase and Head Start led to significant improvements in these outcomes alongside a lower rate of incarceration. Interestingly, Head Start not only improves educational attainment, self-control and self-esteem, but parenting practices as well—more evidence supporting improved intergenerational outcomes through skills investment. [195]

4.2. Causation evidence

While the correlational evidence that non-cognitive skills are strongly associated with better future outcomes,[196] as we saw in Section 2, the evidence behind whether these skills *cause* the outcomes in any meaningful way is relatively weaker. Leslie Gutman and Ingrid Schoon conducted a comprehensive review on the "malleability, causality and sustainability" of non-cognitive skills.[197] Having considered a suite of non-cognitive skills more likely to linked to future outcomes,[198] Gutman and Schoon found "robust, causal evidence that improvement in non-cognitive skills leads to better longer term outcomes is much more limited,"[199] and that the evidence is "relatively weak on whether improvements to non-cognitive skills are transferable across domains and are sustained into the future."[200] See Appendix 1 for an overview of some of this evidence on causation alongside other indicators. Part of the limitation here is due to the quality of the evidence base: there is, thus far, a lack of decent causal evidence. Gutman & Schoon noted the many gaps in the evidence, that "many studies define and measure non-cognitive skills in disparate ways, assess them in isolation, and focus on short-term outcomes." [201]

The evidence, therefore, still has a long way to go. A few years later in 2018, researchers went a step further and undertook a systematic analysis of "the entire interdisciplinary research field on the development of non-cognitive skills," avoiding the tendency within the field of "'cherry picking' of results to bolster a particular concept, theory or intervention."[202] Highlighting on of the challenges of the field, of the 375 studies reviewed, only 142 were deemed of sufficient quality—many of the others didn't control for basic confounding variables. Overall, they concluded that:[203]

> *The evidence under-pinning the importance of non-cognitive skills for life success is diverse and inconsistent. Nevertheless, there is tentative evidence from published studies that non-cognitive skills associate with modest improvements in academic achievement, psychosocial, and language and cognitive outcomes with effects in the range of 0.2-0.4 SD [standard deviations].*

These findings underscore a key message: there is hope for character skills to make a difference, but the limited evidence base suggests that rather than charging in, a "proceed with caution" approach is more appropriate. Psychologist David Caruso characterises the current

situation as "a big messy field, with a lot of promises, but very little data… Right now I think people are just throwing stuff at the wall to see what sticks."[204] Despite a call for higher quality studies, the authors of the above meta-analysis note the potential for an approach to improving employment and education outcomes that goes "beyond the traditional focus on reading, writing and arithmetic, and IQ."[205]

4.3. Case study: Self-control

Self-control is "the capacity for altering one's own responses, especially to bring them into line with standards such as ideals, values, morals and social expectations and to support the attainment of long-term goals."[206] It is an "umbrella construct" capturing many related concepts, with indicators of a lack of self-control including: "emotional lability; proclivity for flying off the handle; low frustration tolerance; lacking persistence; short attention span; distractibility; shifting from activity to activity; restlessness; being overactive; poor impulse control; acting before thinking; difficulty waiting, and difficulty in turn-taking."[207] See Appendix 3 for varying conceptions of self-control.

Professor Richie Poulton argued, as we noted earlier, that self-control "is the *sine qua non* of the non-cognitive skills now regarded as key for life success."[208] We know that levels of self-control correlate with better behavior and academic performance not only in the classroom,[209] but in adult life as well. World-leading New Zealand-based evidence from the Dunedin longitudinal study has shown how childhood self-control predicts higher earnings, better test scores, better health and lower likelihood of criminal activity, even when factors like intelligence and socio-economic status were controlled for.[210] Other studies have also found greater self-control results in lower likelihood of mental health problems across the lifecourse.[211] Researchers also were able to investigate intergenerational effects, and found that children with poor self-control who grew up to be parents were likely to be less-skilled parents based on measurements of parenting quality, and their children more likely to grow up in a sole-parent household. [212]

But while self-control is correlated with success later in life, it also appears less malleable than many other character skills and stabilises in childhood.[213] Experimental evidence suggests that self-control can only be improved in the early years, with several studies suggesting that it becomes relatively fixed by age ten.[214] There is some evidence, however, that self-control is akin to a muscle, whereby "repeated practice and rest can improve self-control strength in the long-term."[215]

Experimental evidence on self-control has shed some light on these questions. The most famous study is the "marshmallow test," devised by psychologist Walter Mischel in the 1960s.[216] Here, Mischel and colleagues tested how long a four-year-old child could wait when presented with a marshmallow and the promise that if they didn't eat it while the experimenter left the room, they would get another. Decades later, researchers found that the longer the child was able to wait, the more likely they would do well at school and the higher they would be paid at work.[217]

The relationship holds under certain conditions; the environment matters. Children with higher intelligence tended to wait longer, but this was at least partly due to their ability to devise strategies to cope with the temptation (also known as metacognition).[218] When children were provided coping strategies or when the marshmallow was not in the child's field of vision, the predictive power of self-control no longer held. Another variation of the marshmallow test introduced an unreliable environment, whereby experimenters gave the children old crayons and promised new ones before the marshmallow test.[219] Experimenters only gave half the children new crayons, and apologised to the others. The children who received crayons waited around four times as long in the marshmallow test as long as those who didn't, which reflects a rational response to an unreliable situation.[220] This suggests that while self-control is less malleable than other skills, the context and metacognitive (ability to think about thinking) skills plays a significant role in the exhibited ability of self-control.[221]

Trauma or adverse childhood experiences (ACEs) like emotional abuse or a parent with substance abuse problems can impact development of self-control. The Growing Up in New Zealand (GUiNZ) conducts a similar experiment called the "gift wrap task,"[222] where children are tested whether they can resist looking at a gift while the interviewer wraps it. Over one quarter looked at least once, around half of these more than once.[223] Research showed how there is a "dose-response" association between early trauma and the children's' ability to delay gratification even when controlling for confounding variables.[224] Preventing ACEs, therefore, provides a

pathway to improving character skills and all of the benefits associated with them for children.

Interventions seeking to improve self-control are being trialed in New Zealand, like ENGAGE.[225] While results of evaluations are forthcoming, anecdotal evidence on behavioral improvements has been positive. It is also worth noting that while New Zealand has outstanding longitudinal data, most of the available evidence on interventions is from overseas—the United States in particular—meaning we must be careful translating evidence to programmes in our local context.

4.4. A proceed with caution approach

Overall, there are "signs of promise" that character skills can make a real difference in children's lives, especially those facing disadvantage. The causal evidence, however, is thus far, limited.[226] This could be interpreted as a policy solution that failed to live up to the hype or rather, as we believe, a relatively nascent area of policy in its early stages and worthy of further investment. There may be a tipping point in the not-too-distant future where a large and rigorous evidence-base points towards dismissing character skills development of any policy interest, but we aren't there yet. Instead, we should continue to seek to understand the causal story about how these skills are developed and sustained, with hope that the evidence will point to new ways to break intergenerational cycles of disadvantage.

5. PRINCIPLES AND POLICIES

Having explored the descriptive side of the demand for character skills now and in the future, alongside the available evidence on how they are developed, we now turn to the prescriptive and outline a series of broad policy principles derived from the discussion thus far.

Principle 1: Early childhood is a critical period for intervention

The reality of critical and sensitive periods of development discussed earlier mean that childhood is a key time to develop character skills. Events in the early years have the strongest influence on later life outcomes. Prevention, if possible, tends to be more effective than remediation, and early investment is potentially be the most cost-effective time for intervention. One meta-analysis, for example, found a cost-benefit ratio of 2.36:1 for early education programmes for 3-4 year olds in low-income families, with a follow-up period of up to 27 years.[227]

Having incorporated insights from at the forefront of psychology and neuroscience, the Center on the Developing Child at Harvard University landed on three "design principles" for effective policy, and therefore better outcomes, for developing children: [228]

1. Support responsive relationships for children and adults.
2. Strengthen core life skills [what we've been calling character skills]
3. Reduce sources of stress in the lives of children and families

Alongside the sensitive periods, the "dynamic complementarity" of skill development, as outlined above, also points towards the importance of the early years. This theory of the cumulative nature of skills development leads to the "Heckman Curve," which illustrates how early investment makes sense from a return-to-investment standpoint. The curve assumes that programmes are of high quality.

Figure 13: Center on the Developing Child at Harvard Policy "design principles"

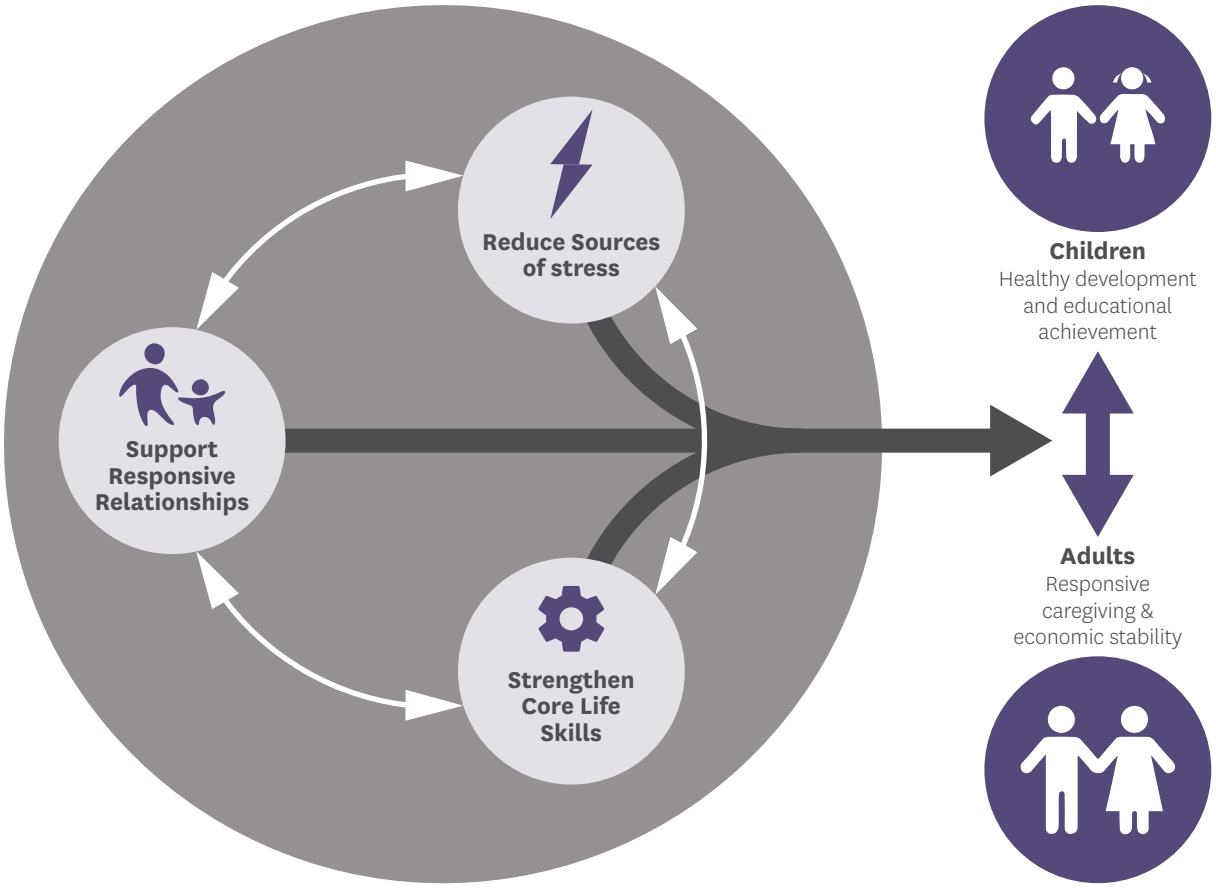
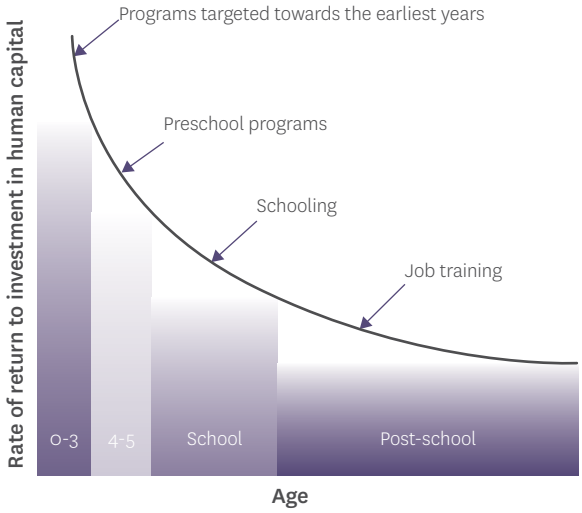


Figure 14: The "Heckman Curve" of return to investment



Source: Heckman (2008), Schools, Skills & Synapses, 54

There is a caveat to this principle: while early investment aligns with the theory that the early years lay the foundation for future skills, this isn't the only criteria to consider when investing in programmes to develop non-cognitive skills. Using the Washington State Institute for Public Policy (WSIPP) dataset, New Zealand-based economists David Rea and Tony Burton found that the relationship between cost-effectiveness and timing of intervention may not be as clear-cut as Heckman's curve purports—that early-years targeted interventions do not necessarily have the greatest cost-benefit ratios and programmes aimed at adults are, on average, cost-effective.[229]

Rea and Burton note that "there are many circumstances where interventions to deliver 'cures' can be as cost effective as 'prevention'," for example in unpredictable situations where "interventions targeted as those who experience an adverse event (such as healthcare in response to a car accident) can plausibly be as cost effective as prevention efforts."[230] It also means low-cost/modest-impact interventions should be considered, and early universal interventions should not be prima facie considered cost-effective. Overall, these findings don't question Heckman's theory on the importance of early investment and the great potential for cumulative benefits, but do illustrate that designing and delivering interventions later in life can still be worthwhile given the correct conditions. The quality of programmes makes all the difference.

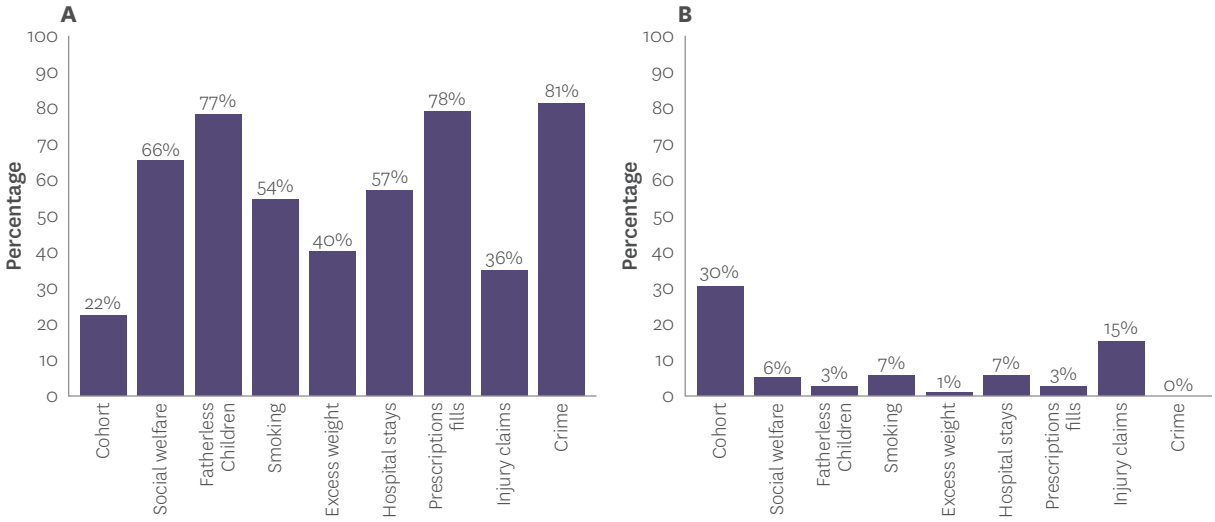
Principle 2: Focusing on the disadvantaged is key

There is a strong case to be made for a focus on disadvantaged children—with Māori and Pasifika children a particularly vulnerable subset of this group.[231] As noted in Section 4 above on sensitive periods, while there is evidence from longitudinal studies that character skills benefit the entire population,[232] it is stronger when it comes to improving the lives of those facing childhood disadvantage. There is less backing, at least from a neuroscientific perspective, for the benefits of interventions boosting "normal-functioning" children with "normal development encounters" versus helping disadvantaged children avoid the harmful impacts of impoverished, "atypical environments."[233]

Part of the reason is that "the difference between the stimulating intervention environment and the environment they would otherwise experience is extremely large."[234] A stimulating environment is largely characterised by responsive relationships between parents (or caregivers) and children, where skill-developing, brain-building "serve-and-return" interactions are common and development-hindering toxic stress as a result of unreliable, inappropriate, or absent responses is rare.[235] Children without responsive relationships will fail to cultivate these skills at an early age and are disadvantaged. While related, development is more closely linked to stimulation from responsive relationships than lack of financial resources.[236] Eric Knudsen and colleagues argue, therefore, that "the most cost-effective strategy for strengthening the future American workforce is to invest greater human and financial resources in the social and cognitive environments of children who are disadvantaged, beginning as early as possible."[237]

This has significant implications for interventions: universal measures may not be effective as targeted ones.[238] Policy-wise, evidence from the Dunedin study combined with integrated data has shown how a small proportion of the population are responsible for a large economic cost across various health and social domains, as Figure 15 overleaf shows.[239]" Consistent with the "pareto principle," whereby 80 percent of the effects come from 20 percent of the sources, around one-fifth of the cohort are in the "economically-burdensome" category.[240]

Figure 15: Distribution of costs to society



a. Costs to society of multiple-high-cost users. Although the multiple-high-cost group made up only 22% of the cohort (*n*=207), it accounted for a disproportionate share of economic-burden outcomes across all eight health and social sectors that we examined. **b.** In contrast, a substantial segment of the cohort did not belong to any high-cost group (30%; *n*=289) and left an unusually light footprint on society.

Source: Avshalom Caspi et. al, "Childhood forecasting of a small segment of the population with large economic burden," *Nature human behaviour* 1, no. 1 (2016).

The researchers aggregated risk factors of growing up in a socioeconomically deprived family, exposure to maltreatment, low IQ, and poor self-control across decades of participants lives for their main analysis.[241] Their results "suggest that the importance of childhood risks for poor adult outcomes has generally been underestimated," and the "question for intervention science becomes not just 'what works?' but 'what works for this multiple-high-cost population segment of children?'"[242] Many of those in the "economically burdensome" group faced childhood disadvantage and poor brain health."[243] Interestingly, a single neurocognitive measure of brain health taken at 3 years old was able to get an almost comparative result to the aggregate measure, showing how crucial healthy brain development is.[244] Because the methodology of this (and similar) research can predict future outcomes at around an accuracy rate of 80 percent, it does raises human rights questions around predictive risk modelling and associated preventative interventions that could potentially stigmatise or discriminate. If policy is targeted on this basis, these questions will first need to worked through at a national level to ensure a well-considered policy position that mitigates the inherent risks, especially to those most vulnerable.[245]

Principle 3: Investing in the right skills

Much of the literature talks about improving cognitive and non-cognitive skills, but less about which particular skills to promote. To fill this gap, Drew Bailey, Greg Duncan, and colleagues from University of California, Irvine propose a skill-building perspective focused on "trifecta skills."[246] These are called trifecta skills because all three criteria below must be satisfied for long-term benefits to be realised:[247]

1. *Malleable*—they can be changed through interventions;
2. *Fundamental* for later success; and
3. *Unlikely to develop eventually* in the absence of an intervention.

Figure 16: Fundamentality and malleability in skills, behaviors, and beliefs.

	Fundamental ⟷ Peripheral	
More malleable ↑	• Math & literacy • Self-concept, academic motivation & implicit theories of intelligence • Emothional self-regulation & executive function • Social and relationship skills	• Test-specific knowledge • SAT test prep • FAFSA information
↓ Less malleable	• Conscientiousness (including grit) • General intelligence	• Ambidexterity

Source: Drew Bailey, Greg Duncan, Candice Odgers, and Winnie Yu, "Persistence and fadeout in the impacts of child and adolescent interventions," *Journal of research on educational effectiveness* 10, no. 1 (2017), 17.

Figure 16 above shows a matrix of fundamental and malleable skills, beliefs, or capacities. Skills outside of the top-left quadrant will not be trifecta skills: test-specific knowledge because it is peripheral to long-term success, and general intelligence or IQ, for it is less malleable. Skills like academic motivation and self-regulation, on the other hand, are more malleable and fundamental for later success, leaving them contenders as trifecta skills.[248] But not everything in the top-left corner is a trifecta skill, because they might be developed "under most counterfactual conditions or are specifically targeted in universally available early formal or informal learning environments."[249] The authors make the distinction, for example, that basic maths and basic literacy skills don't qualify because students are likely to learn a minimal level of these at school—i.e. the benefit of early-interventions fade-out because other children "catch-up" eventually.[250]

The authors also suggest that there are additional trifecta skills for children in very adverse environments. These are:[251]

- Normative cognitive, stress, and immune function for children in fetal or early life conditions characterised by "toxic stress"
- General intelligence for young children in very unstimulating, nutritionally poor or toxin-laden early environments
- Emotional self-regulation for adolescents in violent neighborhoods
- Parenting and communication skills for parents, and parent–child dyads, experiencing multiple stressors

For disadvantaged children in homes facing poverty or other adversity, these skills would not likely be developed without any intervention, meaning that the third criteria would be satisfied. This highlights the importance of targeting policy effectively. Overall, the trifecta skills distinction offers a useful framework for discerning which skills should be targeted for policy that will make a difference in children's lives.

Principle 4: Sustaining environments facilitate long-term benefits

Drew Bailey and colleagues also argue for a strong focus on what they call "sustaining environments."[252] This perspective "views early investments as unproductive unless they are accompanied by subsequent investments in sufficiently high-quality schools and other environmental contexts in which development takes place."[253] James Heckman supports this perspective too, stating that "the advantages gained from effective early interventions are sustained best when they are followed by continued high-quality learning experiences...early investments must be followed by later investments if maximum value is to be realized."[254] Contrasted to a stricter skill-building perspective that assumes developing the right skills will help children make the most of any environment, here, we need a greater focus on following up.

Improving parenting skills is a good example of this. Programmes that seek to improve the parent-child relationship have the dual benefit of improving social relations and parenting skills, but also improving the quality of the on-going home environment. There is good evidence that these kind of preventative programmes, such as those aimed at improving "parenting skills, warmth, and responsiveness,"[255] show benefits across a range of outcomes including increased skill-development decades later.[256] There is scant evidence on mechanism behind these long-term results, but perhaps this thesis explains why the effects of parenting programmes tend to be so enduring. Policies should consider going beyond developing skills in the early years to enabling quality supporting contexts to support continued growth. As Heckman & Mosso put it:[257]

A major lesson from the intervention literature is that successful early childhood interventions scaffold children and supplement parenting. They generate positive and sustained parent-child interactions that last after the interventions end. When programs strengthen home environments in lasting ways, the effects of any intervention are more durable. The early investment administered by an effective program stimulates parental investment contemporaneously, which, through complementarity between parental skills and investment, enhances the impact of any intervention.

Principle 5: Developing parenting skills and relationships more important than income

As some academics put it, "childhood is the province of the family,"[258] and what goes on in the home "shape[s] the lifetime skill base."[259] As we have just discussed, the primary "sustaining environment" is the family home, and the relationships therein are critical for brain and subsequent skills development.

While money is an important factor in improving a broad array of outcomes and lack of sufficient resources can negatively impact parents' capacity,[260] according to James Heckman and Stefano Mosso, "the importance of income and credit constraints in shaping child development... have been exaggerated in the recent literature compared to the importance of parenting and mentoring... untargeted cash transfers are unlikely to be effective in promoting child skills."[261] The evidence suggests that lack of income is not as significant a barrier to skills development as many suppose,[262] and that differences in home environments and parenting explain around half the gap between richer and poorer households.[263] Families certainly need enough income to participate in society, but there is a limit to what more money can achieve. One UK-based study, for example, considered parental confidence and self-esteem, and found that "parents on a low income, but who are confident and able, are as effective at generating character capabilities in their children as parents on a high income."[264] It tends to be factors associated with income rather than income itself that influence development outcomes. As Stephen Scott, Professor of Child Health and Behaviour at King's College London, says:[265]

Poverty is a factor, but not a central one... I am fond of saying poverty of what? And actually it seems to be poverty of the parent-child experience... that leads to poor child outcomes rather than poverty of a material kind.

Heckman goes on to cite educationalist John Dewey who said that "successful schools do what successful parents do,"[266] which he translates into this context as "successful interventions in skills across the life cycle do what successful parents and mentors do." When it comes to the "what successful parents do" question, the weight of the research suggests that best-practice for parents is a combination of warmth and responsiveness alongside firm rules and clear boundaries.[267] Attachment and engagement of parents is key, and mentoring and "scaffolding" for interventions aimed at adolescents in particular.[268] Research using the Growing Up in New Zealand data has also shown the importance of the notion of "parents as first teachers," where time spent "reading, writing and counting" with children measurably improved early learning outcomes.[269]

A recent report by the OECD outlines how empowering vulnerable families through parenting and home-visiting programmes, alongside character skill-building opportunities with supportive adults in mentoring, sport, or cultural experiences is key for "changing the odds" for disadvantaged children.[270] There is some solid domestic evidence. In New Zealand, Evaluators of parenting programme Incredible Years found "clear and significant benefits in the areas of child behaviour, parenting, and family relationships" both post-course and 30 months later.[271] Similarly, research into home-visiting programme HIPPY (Home Interaction Programme for Parents and Youngsters) has found that it improves literacy, numeracy, and socio-emotional development for children in low-income families.[272] HIPPY focuses on the parent-child relationship and equips parents to be their children's first teachers.

Parents are best placed to instill these character skills in their children, but there is a role for schools, community organisations, and government to step in and support those who haven't had the opportunity to develop these skills. Another way of putting it is: get families right, but if not, emulate them.[273]

Principle 6: Aligning concepts and practice leads to better results

Policy-makers and practitioners seeking to implement evidence-based strategies and programmes to improve character skills are in for a challenge because the conceptual work is far behind the enthusiasm for the concept, which "is growing faster than the rate at which the field is able, or willing, to generate a unifying framework."[274]

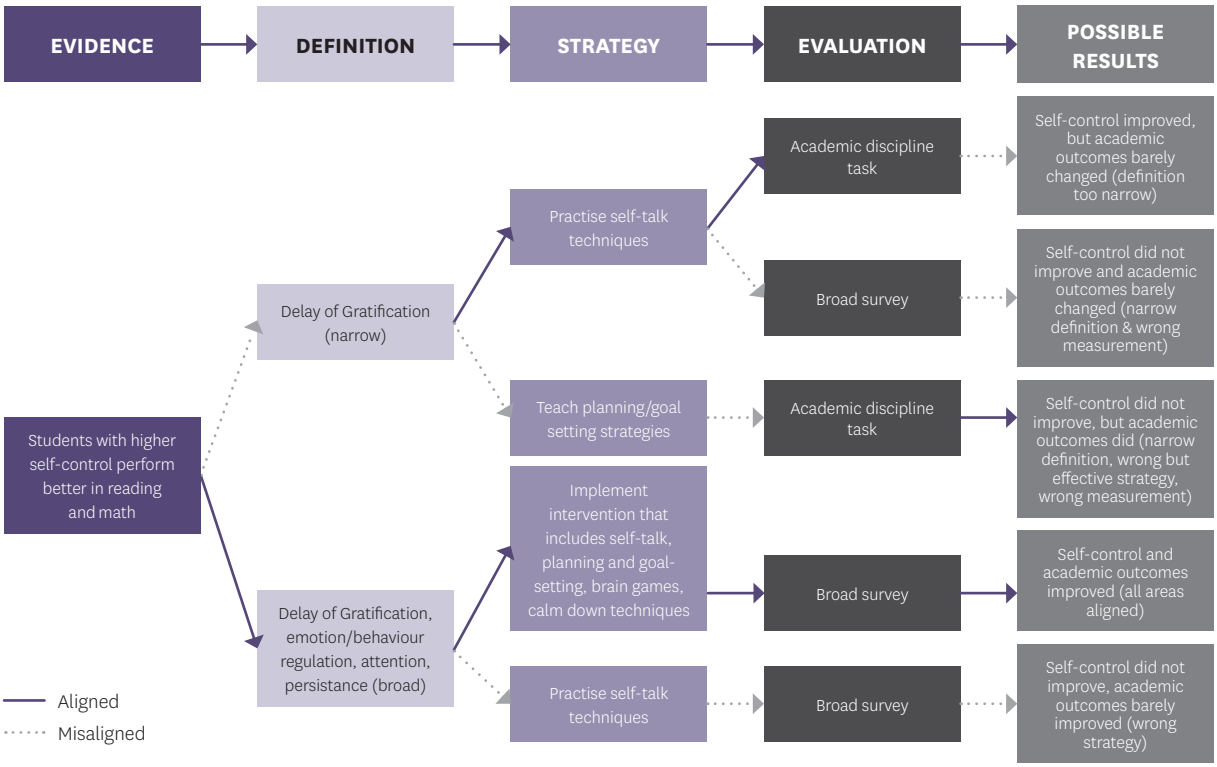
As we can see in Figure 17 below, taking time to ensure that concept, evidence, definition, strategy and evaluation are all aligned is the only way to break through the conceptual mess and work towards well-defined goals. Without a rigorous understanding of how all of the pieces of the puzzle fit together, unintended consequences and outcomes will be rife, and as American educator Grover Whitehurst writes, these skills "are far too important for the education reform effort associated with them to suffer the fad-like fate of far too many education reforms of the past."[275]

Principle 7: The importance of evaluation – evidence over intuition

Improving skills makes intuitive sense, but it's important that the evidence base supports the intuition—we can't afford character skills to be "a bandwagon with loose wheels."[276] There is a cautionary tale from formal driver education at high schools in the US and Australasia. While it seems logical that more training on the road would reduce accident rates for young people—there is solid evidence that shows that it either has no effect, and in some cases, even increases accident rates.[277] It is hypothesised that it leads to over-confidence and greater risk-taking activity. As Sir Peter Gluckman and colleagues say, "intuition, anecdote and dogma are not grounds on which to invest."[278]

The failure of the self-esteem movement is another example of good intentions gone awry. When researchers discovered that high self-worth was important, educators translated this into practice where participation was praised without a concomitant focus on improved results. There was little improvement in achievement. Carol Dweck, author of the best-selling book *Growth*

Figure 17: Alignment and Misalignment of concepts and practice.



Source: Stephanie Jones et al., What is the Same and What is Different? Making Sense of the "Non-Cognitive" Domain: Helping Educators Translate Research into Practice (2016), 13.

Mindset, said "the thing keeps me up at night is that some educators are turning mindset into the new self-esteem, which is to make kids feel good about any effort they put in, whether they learn or not. But for me the growth mindset is a tool for learning and improvement. It's not just a vehicle for making children feel good."[279]

Similarly, psychologist Angela Duckworth, famous for her work on *Grit*, likens the evidence base into her work as "a firm foundation…but we're still building the house."[280] "The enthusiasm is getting ahead of the science," said Duckworth. [281] As more evidence and evaluation becomes available, the challenges of implementing and scaling up interventions are becoming more apparent.[282] For character skills to be developed in a way that changes lives, we need to make sure our enthusiasm is backed by evidence, and adjust our implementations accordingly.

6. CONCLUSION: CHARACTER SKILLS NOW AND FOR THE FUTURE

Employers are scrambling to find workers with character skills. As the fastest-growing sectors of the economy rely on people with these skills, character skills are in demand and being rewarded now, and this will only grow in the future with advances in automation and AI on the horizon. While the hysteria over robots-related job losses continues, there is mounting evidence that this change will be a slower revolution than the futurists suggest—especially in New Zealand.

Nonetheless, technology has and will continue changing how we work and we must adapt our education, training, and development systems to give people the best chance of flourishing, not just in the workplace but in life too. This means, as we have argued, making the most of our humanity. As author Christian Madsbjerg says:[283]

> *Today we are so focused on STEM-based knowledge—theories from science, technology, engineering and math, and the abstractions of "big data"—that alternative frameworks for explaining reality have been rendered close to obsolete. This pendulum shift is doing great damage to our businesses, governments, and institutions...society devalues our human inferences and judgements at a great cost."*

Staying on the current course will not only be a lost opportunity, it will mean those facing disadvantage being further left behind by a dynamic economy, while those with the skills for the future that can complement technology, will stream more and more ahead. Inequality will only get worse unless we change course, and preparing vulnerable workers for the disruption to come should be a key focus.

Developing character skills is a key part of this shift. As we have seen, they are associated with better education and employment outcomes, and more people with these skills is both a good in and of itself, but also instrumental to improved outcomes in the future, especially for disadvantaged children. The good news is that we can do something. We need not abandon academic tests or STEM studies for example, but we need to acknowledge the complementary power of character skills.

Similarly, there is a complementary role to play for many key institutions across the life-course—parents and caregivers, schools, community organisations, and employers all have opportunities to make a difference on the developmental trajectory of New Zealanders. We call on the Government to take heed of the evidence presented here and respond by supporting these institutions to help fulfil a vision of Aotearoa New Zealand as a character-building society. Creating a policy framework, a rigorous measurement and evaluation system, alongside identifying and preparing vulnerable workers for the upcoming changes through re-skilling are all good places to start. But cushioning the impact of technology is only part of the response, the long-game involves re-balancing and re-imagining our skills-development pathways to bolster character skills. Focusing on the early years and the disadvantaged in particular, on parenting and relationships, and evidence-based programmes in schools will go a long way towards this.

It is still early days for research into character skills. As a relatively new, fastly-expanding, and difficult-to-conceptualise field, methodological problems remain a challenge. But just because the academic field is in its early stages doesn't mean that there is no hope for clarity in the future. The literature is maturing, going beyond the correlation hype towards testing and establishing robust causal stories and successful interventions over the long-run. Researchers here must continue the world-leading work and devote more time towards these questions. There is good neuroscientific, economic, and psychological rationale for seeking to understand and build these skills. We should proceed with caution and optimism in equal parts.

This paper has been, to some extent, a reframing exercise. Firstly, instead of a "nice-to-have," character skills are critical to our future for work and education success and secondly, shifting from nightmarish visions of robots causing mass unemployment to one where jobs of the future balance the complementary strengths of humans and technology. The "AI Paradox," as Oxford Economics puts it, is that technological advances provide the opportunity for us to do more meaningful work—work that only humans can do. The future is one where that which makes us human is our most valuable asset. As Andreas Schleicher from the OECD says, there is a great opportunity to "think harder of what makes us human," to help develop "first-class humans" rather than "second-class robots."[284] This is not just about economic gains, but more importantly, about human flourishing. Developing character skills holds a key to unlock this potential.

APPENDICES:

Appendix 1: Evidence on particular non-cognitive skills[285]

The following table, sourced from Gutman & Schoon's 2013 literature review, summarises the main findings of the non-cognitive skills research:

	Quality of measurement	Malleability	Effect on other outcomes	Strength of evidence
1. Self-Perceptions				
Self-Concept of Ability	High	Medium	Not available	Medium
Self-Efficacy	High	High	High	Medium
2. Motivation				
Achievement Goal Theory	High	Medium	Low to medium	Medium
Intrinsic Motication	High	Medium	Low to medium	High
Expectancy-Value Theory	Medium	Not available	Medium to high	Medium
3. Perseverance				
Engagement	Medium	Not available	Not available	Low
Grit	Medium	No evidence	No evidence	Low
4. Self-Control	Medium	Low to medium	Low	Medium
5. Meta-Cognition	Medium	Medium to high	Medium to high	High
6. Social Competencies				
Leadership Skills	Low	Not available	No evidence	Low
Social Skills	Medium	Medium to high	Low to medium	High
7. Resilience and Coping	Medium	High	Low	Medium
8. Creativity	Medium	Not available	No evidence	Low

Source: Leslie Morrison Gutman and Ingrid Schoon, "The impact of non-cognitive skills on outcomes for young people," Education Endowment Foundation 59, no. 22 (2013), 40.

The categories are defined as:

- **Robust Validated Measurement.** High = widely used validated measures; Medium = at least one validated measure; Low = measures with questionable psychometric properties.
- **Malleability.** High = large effect size from pre to post (d = .80 to .50); Medium = medium effect size (d = .50 to .20); Low = low effect size (d = .20 or less); Not Available = limited experimental evidence but no effect sizes available, No Evidence = correlational evidence only.
- **Causal effect on other outcomes.** High = large effect size from pre to post (d > .80); Medium = medium effect size (d < .50); Low = low effect size (d < .20); Not Available = limited experimental evidence but no effect sizes available, No Evidence = correlational evidence only.
- **Strength of Evidence.** High = several large scale meta-analyses of experimental studies; Medium = few experimental studies; Low = limited number of quasi-experimental or correlational studies.

Appendix 2: Evidence for different kinds of interventions

Intervention type	Target population	Location	Target age	Effect on other outcomes
Mentoring	Selected	Community-based*	School-age	Low
Service Learning	Universal	School-based**	School-age/University	Low to medium
Outdoor adventure	Universal, selected	Outdoors	Older children/ adolescents	Low to medium
SEL	Universal	School-based	School-age	Low to medium

*Findings suggest that community-based compared to school-based programmes have larger effects.

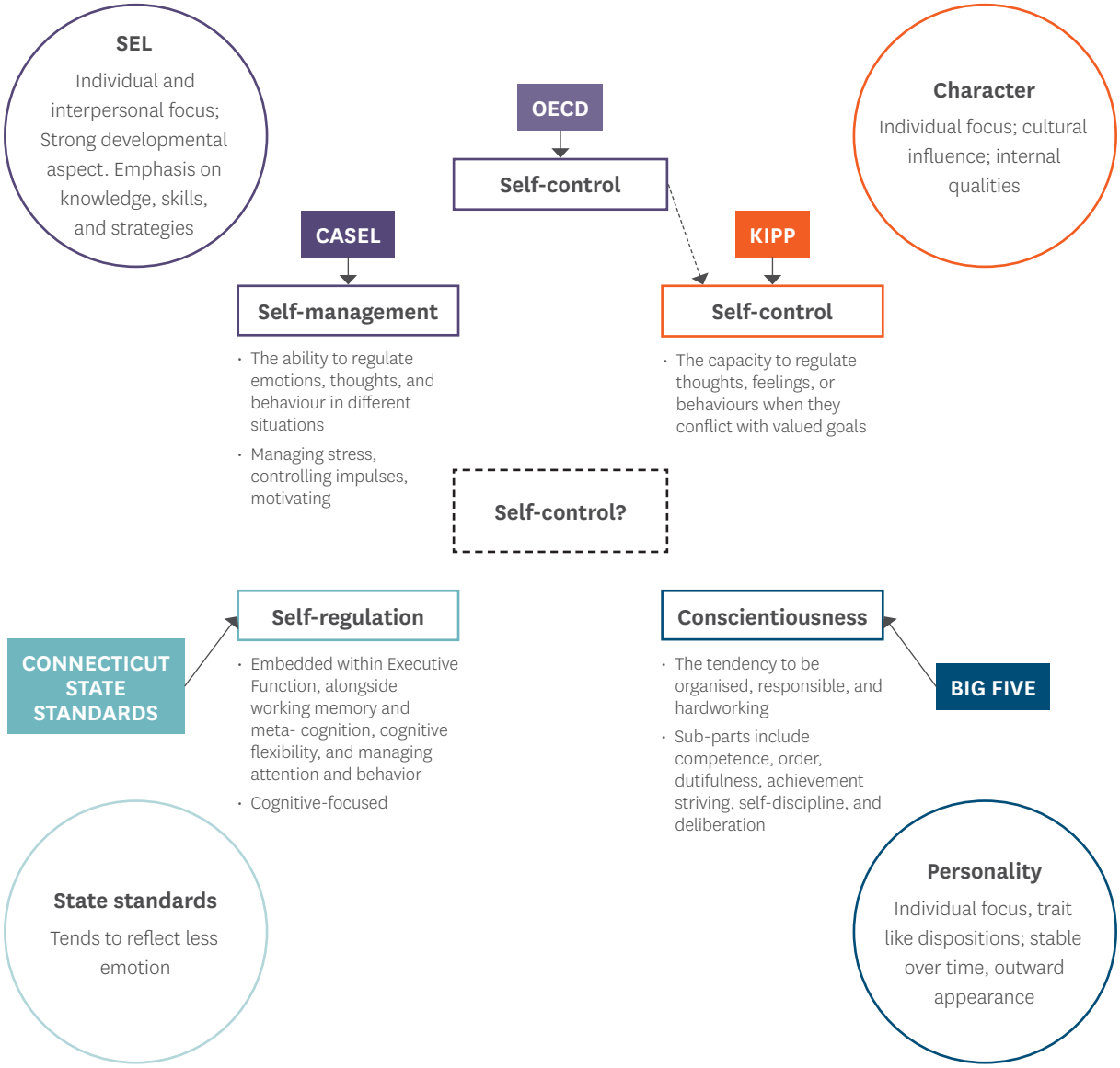
**Findings suggest that school-based compared to community-based programmes have larger effects.

Source: Leslie Morrison Gutman and Ingrid Schoon, "The impact of non-cognitive skills on outcomes for young people," Education Endowment Foundation 59, no. 22 (2013), 42.

Definitions:

- **Category.**
  Universal = target the general public or a whole population group that has not been identified on the basis of individual risk;
  Selective = focus on individuals or population subgroups who have biological, psychological, or social risk factors, placing them at higher than average likelihood of developing a mental disorder.
- **Strength of Evidence of Causal Effect.**
  Large = large effect size on other outcomes (d = .80 to .50);
  Medium = medium effect size (d = .50 to .20);
  Low = low effect size (d = .20 or less).

Appendix 3: Four different frameworks of self-control



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