Technology, change, and uncertainty: maintaining career confidence in the early 21st century

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Abstract
Over the coming decades, technology and automation are expected to dramatically transform how work will be undertaken. While many of these developments will improve productivity and provide new opportunities, some jobs will likely disappear. In this article, we report data from in-depth interviews undertaken with 51 young Australians about their strategies for managing the possibility of technological disruption in the workplace. In the face of future uncertainties, we found that the majority of our participants remained confident in their ability to maintain for themselves a 'good' career story. We posit, however, that those who could neither avoid nor reduce the possibility that technological advancements might jeopardise their career plans demonstrated an outlook of career malleability whereby they accepted the risk yet remained subjectively confident in their own capacity to rewrite their career narrative if, or when, circumstances demanded.

Keywords: the future of work, career planning, ontological security, uncertainty and risk, digital disruption

Introduction

We have entered the Fourth Industrial Revolution. This is an era in which automation, artificial intelligence, and universal interconnectivity are transforming the workplace and redefining opportunities (Brynjolfsson and McAfee, 2016; Schwab, 2016). A change of work practices because of new inventions is by no means a recent or unique phenomenon.

Alongside technological progress, history has always seen the disappearance of some jobs and the emergence of others. What is new is that advancements are now occurring exponentially and simultaneously. This is generating what has been described as a 'perfect storm' – one that will significantly impact work in the future (Hajkowicz et al., 2016: 7).

Media coverage supports the notion that technological advances are dramatically changing our work and threatening employment. For instance, popular media continue to report that our jobs will be taken over by robots (Wakefield, 2015; Wall, 2018), unemployment rates will increase, wages will suffer, and employment conditions will become increasingly precarious (Kehoe, 2018; Letts, 2018). While the extent to which these claims can be substantiated remains a matter of debate (see Autor, 2015; Arntz et al., 2017), news headlines such as 'Adapt or die: How to cope when the bots take your job' (Wall, 2018) highlight how such warnings could cause public uncertainty. It would also be fair to say that the burden is being placed upon individuals to prepare for this new future, and to protect themselves against the potential risks of digital disruption.

In this article, we draw on qualitative data from a study of 51 Australians who are currently aged in their mid-20s, to explore how people at the beginning of their working lifetimes are responding to these predicted threats to work and employment. We have undertaken in-depth interviews with these individuals and documented their understandings of the opportunities and challenges that are likely to occur over the coming decades because of technological advancement. Elaborating on sociological literature related to the individualisation of risk (Beck, 1992) and ontological security (Giddens, 1991), we explain how individuals are maintaining a sense of career confidence, despite facing uncertainties about how an increased use of technology and automation in the workplace will ultimately influence their career plans.[1]

Technology and the future of work
In the 21st century, the rate and range of technological advancements are predicted to dramatically transform how work is undertaken. Automation will no longer be limited to carrying out tasks that are simple and repetitive and will include activities that require high levels of accuracy and precision. Added to this, sophisticated systems of machine learning and artificial intelligence will see machines able to accomplish a broad range of complex activities (Schwab, 2016).

The internet will also continue to change how work is done. Already we have seen dramatic changes in retail, entertainment, and service provision practices because of interconnected computer networks. In addition, the interconnectivity of digital devices via the web (the 'Internet of Things') offers new opportunities for how information is gathered, analysed, and applied. As the number of internet-enabled devices and computers that are connected to one another rises, this in turn is shaping decisions about how human labour is deployed (Dutton, 2014).

Widespread developments in technology mean that labour requirements and work functions will likely be redefined. There is also a possibility that some jobs will ultimately disappear (Centre for the New Economy and Society, 2018). While the total number of jobs in developed countries under threat over the coming years has been disputed (see Arntz et al., 2017), some analysts have put the figure upwards of 40–50 per cent. A study by Frey and Osborne (2017), for example, predicts that within 20 years, 47 per cent of current jobs in the United States will disappear. Similar figures have also been forecasted in Australia (Durrent-Whyte et al., 2015; Edmonds and Bradley, 2015). There may also be a shift towards increased outsourcing of work, flexible contracts, freelancing, or 'gig' jobs, thereby compromising job security for many individuals (Centre for the New Economy and Society, 2018).

But technological advancement may not necessarily lead to increased unemployment and precarious working conditions. In certain instances, machines will complement human labour – potentially increasing output and earnings (Autor, 2015). There are also many sectors where the use of automation will remain limited, including roles that require high levels of creative intelligence, the ability to problem-solve, or strong interpersonal skills (Autor, 2015; Edmonds and Bradley, 2015). Furthermore, new technologies have the potential to create new and exciting opportunities that are yet to be imagined (Arntz et al., 2016; Borland and Coelli, 2017).

We cannot accurately predict the true impact that emerging technologies will have on future job availability, but the rhetoric surrounding threat to employment is creating a degree of 'automation anxiety' within both the public and academic spheres (see Autor, 2015; Arntz et al., 2017). While it is possible that the negative consequences of technology on job rates are being overstated, the purpose of this article is not to test the validity of these projections. Instead, it focuses on understanding how young adults are reacting to the discourses of uncertainty surrounding these rather ominous forecasts, and whether they think their own future career plans are likely to be compromised. If they believe there is risk, we also want to understand how they are responding to that potential threat.

Career confidence in a time of change

Predictions regarding the future of work raise questions about how people maintain a sense of career confidence in the 21st century amid concerns associated with increased technological disruption. According to Beck (1992), we are living in a 'risk society', surrounded by an increasing number of 'manufactured uncertainties' – the detrimental impact of technological progress. As these threats increase and intensify, governmental systems are less able to control their consequences, and the onus has shifted onto the individual to reflexively evaluate any risk and, if necessary, take decisive action to eliminate or reduce that threat. Vigilance is the individual's obligation, and management of risk is their own responsibility.

It is also been argued that, due to changes in the social fabric, people now have greater control over who they will be and what they will do. Instead of a person's life path being determined by structures, the biographical project is thought to have become more self-

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determined (Giddens, 1991; Beck, 1992; Bauman, 2001; Beck and Beck-Gernsheim, 2002). Giddens (1991) argues that, when planning and negotiating their life pathway, the individual will seek to achieve a sense of *ontological security* – certainty that their plans are sustainable within the social context and confidence in who they are and what they are capable of achieving. As he explains, 'to be ontologically secure is to possess, on the level of the unconscious and practical consciousness, "answers" to fundamental existential questions' that inform the individual's biographical narrative (Giddens, 1991: 47). Essentially, ontological security is achieved via the individual's confidence in their ability to create a 'good' life story. However, if there is uncertainty borne from social disruption, and the individual experiences a sense of helplessness, they may experience *ontological insecurity* – feelings of self-doubt and anxiety derived from concern that their biographical narrative cannot be predicted (Giddens, 1991: 53).

The concepts of individualised risk and ontological security are useful for developing a sociological understanding of how employment opportunities and challenges brought about by the Fourth Industrial Revolution might be perceived and managed by individuals in contemporary Western societies. Reporting on how people achieve *career security*, Scillio (2017: 18) draws on these well-established frameworks to describe how individuals reflexively negotiate 'conditions of risk, uncertainty and multiple choices' with respect to career planning: he defines career security as a 'subjective sense of security, related to our career stories' that is contingent on an individual's capacity 'to "maintain" a career narrative' (Scillio, 2017: 211). The ability to identify and negotiate any barriers to achieving their career goals enables the individual to sustain this narrative. They may modify their plans, if necessary, but will ultimately aim to preserve objectives that are consistent with their overall career goals. If a person believes that the barriers to creating a 'good' future career story are insurmountable, they can experience angst and confusion – in other words, *career insecurity* (Scillio, 2017).

The anticipated consequences of this Fourth Industrial Revolution present the individual with a very distinctive set of uncertainties, risks, and choices when it comes to preparing for the future of work. In this study, these frameworks therefore serve as a starting point for investigating whether Australians who are at the beginning of their working lives believe that the increased use of technology in their workplace will threaten the viability of their career plans over the coming decades. In the context of this uncertain employment horizon, where warnings of digital disruption prevail, we seek to better understand how confidence in their future career story can be maintained.

Data and methods
Data collection
The data for this research come from the 'Social Futures and Life Pathways of Young People in Queensland' project, which is an ongoing longitudinal study of young people from Queensland, Australia. Also known as 'Our Lives', this project has been following a single-aged cohort of young Australians as they have moved from adolescence and into adulthood. The project commenced in 2006 when the cohort was 12–13 years old. Six waves of

quantitative data collection have so far been completed, with the most recent being carried out in 2017 ($N = 2,030$). Qualitative interviews are also regularly undertaken with selected participants (see Our Lives, 2018).

In 2017, interviews were undertaken with 51 members of the cohort to better understand their educational and career pathways. All 'active'[2] members of the Our Lives cohort were categorised as living in urban or regional/remote regions of Australia. Participants were then selected randomly from these categories. The final interview sample comprised 27 males and 24 females. Twenty-nine participants were living in an Australian major city; 22 resided in regional/remote Australia. The interviews were semi-structured and conducted via telephone. Participants were questioned about both their past and current education and their employment activities. They were also asked about their future educational and employment aspirations. Those who intended to work in a particular industry for the foreseeable future were asked about technology-driven changes in their chosen profession and whether they thought these changes would compromise their personal plans. All interviews were audio-recorded and transcribed, and participants' names were pseudonymised to protect confidentiality.

At the time of interview, the participants were 23–24 years old. Thirty-eight (74.5 per cent) had achieved a non-school qualification certificate level III or above; twenty-eight (55 per cent) possessed a bachelor's degree or above; and four more were still studying for a bachelor's degree. Ten interviewees had completed no post-school education and were undertaking no study (see Appendix 1). These statistics differ somewhat from the national average. The Australian Bureau of Statistics (ABS) estimated that in 2017, 69 per cent of Australians aged between 25 and 29 had attained a non-school qualification certificate level III or above.[3] The national average reported for Australians in this age group with a bachelor's degree or above was 38.5 per cent. The percentage of participants engaged in some level of work or study was 96 per cent. By comparison, the ABS (2017) national estimate of individuals aged between 25 and 29 years deemed 'fully engaged' was 71 per cent. However, while the Our Lives sample was overall more 'qualified' and 'engaged' than the national average, it comprised a broad spread of educational attainment and employment outlooks, which allowed us to meaningfully address the research question at hand.

Methodology
We adopt the ontological assumption that theoretical knowledge can be gleaned from the narratives of social actors. To this end, our research is informed by an abductive research strategy (Blaikie, 2007; Timmermans and Tavory, 2012; Tavory and Timmermans, 2014).[4] When applying this methodological approach, the researcher will commence their investigation by reviewing relevant literature. Any existing theories, however, will serve only as a guide when entering the field. A better understanding of the phenomenon being explored is achieved by analysing people's 'everyday lay concepts and motives' (Blaikie, 2007: 67). By implementing abductive reasoning, the researcher recognises their role as a collaborator in knowledge production, moving iteratively between the data and extant theory to develop concepts and categories informed by an evolving conceptual framework (Blaikie, 2007; Ong,

2012; Timmermans and Tavory, 2012). The researcher seeks pragmatic answers to make ongoing sense of tensions, surprises, and anomalies, and this process takes place not as a set of discrete steps but instead by 'simultaneously puzzling over empirical materials and theoretical literatures' (Schwartz-Shea and Yanow, 2012: 27). While our investigations were in large part informed by extant theory relating to the notion of career security, we were cognisant that the data might reveal experiences and perspectives that would challenge those understandings (Blaikie, 2007). We were also aware that we might need to draw on alternative theoretical explanations to describe and understand the data.

Analysis of data
The interview data were coded using NVivo software with links to theoretical concepts being made via the analytical process, as summarised in Appendix 1.

Informed by the concepts of career security and career insecurity (Scillio, 2017), we first evaluated the career outlook of each participant. We considered the extent to which participants were certain about what career path they would like to follow and confident in their ability to ultimately achieve a satisfying career outcome. Thirty-six individuals spoke of their career future with both certainty and confidence. They were clear about the career trajectory they would follow and were also confident about their future career success. They were therefore categorised as showing *career security*. Eleven individuals were flexible in their career outlook and were willing to follow a new professional pathway if their interests or circumstances changed. Although uncertain of the direction they might head, they nonetheless expressed confidence in their capacity to achieve a 'good' career future. Where Scillio (2017) might consider an individual able to maintain a sense of confidence without career clarity as being career secure, we instead labelled this outlook one of *career malleability*, which allowed us to make a clearer distinction between those who were 'certain' and 'confident' versus those who were 'uncertain' yet 'confident'. The accounts of the remaining four individuals were consistent with the definition of career insecurity articulated by Scillio (2017). They were both 'uncertain' and 'not confident', meaning that they could not imagine the career they might be suited to and lacked confidence about their future career prospects (see Figure 1).

To understand how technological advancements might impact our participants' personal career plans, we then analysed the accounts of 40 participants who, regardless of career outlook, spoke about working in a specific industry for an extended period of time (i.e. 10+ years). When trying to manage uncertainties of contemporary life, Zinn (2004) argues that individuals will evaluate the likelihood of experiencing a negative outcome from that uncertainty. They will then decide what steps are necessary to protect themselves. This approach therefore comprises two elements: *certainty constructions* – evaluating the extent to which one's biographical narrative is facing threat, and *protective actions* – taking steps to guard against any threat. Drawing on these constructs, we considered (1) whether the participants believed there was a risk of technology or automation threatening their capacity to remain in a desired industry (certainty constructions), and (2) their strategies for managing any associated risks (protective actions).

The analysis identified four types of responses to the increased use of technology in the workplace: *adopt, avoid*, *reduce*, and *accept*. Those in the *adopt* category argued that the use of new inventions and processes would improve their opportunities rather than limit them. Individuals in the *avoid* category believed that they had eluded any threat by choosing an industry where human interaction was paramount. Participants in the *reduce* category felt that technology was changing their profession and that their own career plans might ultimately be threatened because of this. Their response would be to move into a role within the industry that could not be replaced by automation. And individuals in the *accept* category also said that technology could disrupt their career trajectory. Instead of taking steps to protect themselves, however, they were willing to accept this risk and follow a different professional direction if need demanded. Next, we will describe the data. We will then consider the theoretical and practical implications of our findings in the discussion section.

Findings
Confidence and certainty?
Before focusing on the issue of technological disruption, it was first important to determine the extent to which our participants were certain about the career path they would follow and confident in their ability to experience a good future career story. As might be expected, we encountered a broad range of career aspirations and expectations. Within this sample, only four individuals exhibited career insecurity – that is, a lack of career confidence and certainty about their working future (Scillio, 2017). Interestingly, they all spoke about having experienced mental or physical health issues and described the challenges they had experienced completing their education and entering the job market.

The majority of participants expressed certainty and confidence in regards to career security. This outlook did not appear to be related to any objective evaluations regarding the long-term sustainability of the industry they wished to stay in. They had picked the path they would follow and believed that, with perseverance and effort, they could realise their ambitions. Moreover, if they did acknowledge that employment in their selected field was potentially precarious, a common response was that they, as an individual, had the personal drive and agency to ultimately succeed whereas others might not. Jack, for example, spoke of wanting to be a music composer. He described the difficulties he was experiencing finding steady employment in that field. Regardless of these challenges, he remained resolute in his ambition and confident in his ability to eventually achieve his goal. As he explained: 'I'm confident I'll get there. There's a lot of people that don't get there... but I think there's a lot of people who also don't have the drive to do it like I do.' Florence, a track worker, also believed that she possessed an attitude and skills that others did not have. Like Jack, she was sure that she could succeed in her field whereas others might not:

> I'm confident in myself. I know that much... There's a lot of people that go, 'Yeah, I'm a trackwork rider,' and can't ride a horse to save their life... But then they've got people, say, like myself, that I can do the gallops and everything like that... I'm a valuable asset to anyone that can hire me. (Florence)

The remaining individuals were less resolute about following a particular pathway yet still steadfast in their confidence. They expected to have multiple professions throughout their lifetime but could not say with certainty what those would be. To explain this perspective, some argued that they simply could not personally imagine themselves working in the same field for an extended period of time. Others believed that having a lifetime career was no longer a realistic expectation. This argument is consistent with a 2016 report issued by the Foundation for Young Australians, which claims that an Australian who is currently 25 years old can expect to work in five or more industries and have more than 17 positions during the course of their working life (FYA, 2016). Freya, a development consultant, explained that, although she had been encouraged at school to train in a specific discipline, she believed it was unrealistic to expect to remain in the same profession throughout an individual's whole working life. Piper had a similar view. She was trained as a speech pathologist but anticipated pursuing a number of professional pathways during her lifetime. As she explained, she was already preparing for this reality:

> I am making conscious decisions about what I want to do next or what I will want to do at some stage, and the fact that I would go down a couple of different paths and the decisions that I make could lead me in very different paths. (Piper)

The point of commonality among the career malleable group was that, while they were uncertain about the direction of their career pathway, they were certain that they possessed enough personal aptitude and fortitude to refashion their career story if, or when, the need arose. For example, Austin, who worked in retail, described himself as being 'really good at adapting to different roles'. Chloe, a science student, also believed that she could change career direction if necessary. She explained that, although she did not know for certain what she would do in the future, she was adaptable and quick-thinking and was convinced she would always find employment in whatever industry she chose to work in. As she put it:

> You rock up somewhere and do something you don't know how to do, how to very quickly figure out what it is that you need to do and how to do it. That's a skillset that I've got. (Chloe)

The changing workplace
In Australia and many places across the globe, new technologies are visibly transforming industries, organisations, and businesses: they have helped to increase efficiency, expand markets, and offer new opportunities. But as technology becomes more prevalent in the workplace, job processes will inevitably continue to change – and perhaps disappear altogether. Irrespective of the industry in which they worked, many participants in this study had become attuned to the reality of these changes in their own workplaces.

Agriculture is one industry in which widespread adoption and utilisation of technology is taking place. Farming in Australia often involves working in remote locations and across enormous surface areas. This means that the management of crops and livestock can be extremely time-intensive. It can also be difficult and costly for property owners to employ extra labour. In this way, 'digital agriculture' offers farmers the opportunity to run their

systems more efficiently (CSIRO, 2018). Louis, an electrician, described how Wi-Fi networks were assisting farmers in the day-to-day management of their properties, allowing them to monitor their farms remotely and make better use of their time. The use of technology has also become central in the Australian education sector. For example, the focus on providing students with technology-enriched learning environments has seen the introduction of computers and tablets in the classroom and more content being delivered online (Thomson, 2015). These are the types of advancements that Charlotte, a teacher, was already noticing in schools. She also believed that further change was inevitable and that the role of the teacher would shift from the delivery of content to the facilitation of learning. Information technology has likewise transformed policing practices and offers front-line personnel the ability to undertake a 'smarter' and more efficient style of policing (Chan, 2001: 156). Working as a police officer, Justin described how its use has become routine in many day-to-day operations. He gave the example of how the process of running a check on an individual has changed and explained how automation was helping to save time:

> So back in the day, if you drove past a car, I'd need to get on the radio, get in a queue, run a check, then they'd get back to me... Now from punching a rego within about five to 10 seconds I can have in my screen, your photo, your national history, everything. Your address, phone numbers, associates, everything. We've got vehicles that read number plates straight away, we've got face recognising equipment that does it all for us. A lot of it has become automated.

Retail and banking are also areas experiencing changes due to increased use of automation. Online services and self-service checkouts are already reducing the need for counter staff in many businesses (CEDA, 2015; Edmonds and Bradley, 2015). Jasmine, who works in a post office, described the increased use of self-serve technology:

> In some of the major post offices they've got self-serve centres, so whether you will be needed is another thing, like in supermarkets and stuff where they've got the self-serve. I guess a lot of it is going to go digital now and people pay everything online and stuff. (Jasmine)

Adopting technology

When considering whether their chosen career industry might be threatened, some participants spoke about how technological progress would likely improve their employment prospects. The engineers among this cohort were particularly enthusiastic about seeing new opportunities in their profession. For example, with new innovations, Sebastian believed that in innovation economy, there would be a high demand for engineers and that the number of jobs would increase. Phoebe, who was studying to be a medical engineer, made a similar argument and was ready for the future possibilities that technology would bring to her field:

> It's going to be amazing. There's so much more money that's going to be thrown at it – medical devices, diagnostic devices. I mean, this is all just taking off. (Phoebe)

The construct of 'technology readiness', as Parasuraman and Colby (2015) describe, refers to an individual's preparedness to use new technologies. Factors thought to motivate technology readiness include optimism and innovativeness. In this context, optimism is described as a person's 'positive view of technology and a belief that is offers increased control, flexibility, and efficiency in their lives', whereas innovativeness denotes 'a tendency to be a technology pioneer and thought leader' (Parasuraman and Colby, 2015: 60). In their interview responses, our *adopt* participants demonstrated both optimism and innovativeness in their readiness to take advantage of new technologies. If, as Borland and Coelli put it, 'technological change creates winners and losers' (2017: 392), they were confident in their ability to be winners. David, for example, who had studied agricultural science and wanted to be a farmer, was keen to take advantage of the opportunities that emerging technologies offered. He believed that, by staying informed and learning about advancements, he would be better positioned to gain maximum benefit from them:

> Keeping ahead of the turns. Where every time something new and interesting comes out, instead of just ignoring it and continuing on how you used to do it, I think it's really important that you open your eyes and you use the machine to its full capability. I think the technologies help you, not take over from you. (David)

Interestingly, some participants suggested that this 'technology readiness' was a characteristic inherent to their generation. Because of their age, they felt that they were better positioned than previous generations to appreciate and realise the benefits of technologies in the workplace. As a consequence, they considered themselves prepared for both the opportunities and the challenges associated with incorporating new technologies into their work. Connor, a member of the police force, felt that older officers might be less inclined, or less able, to keep up with the new technologies in his workplace, whereas he was more adaptable because of his relative youth:

> I guess probably because it's a generation that didn't grow up with technology in the first instance. So for them to be moving to more advanced computer programs using Apple iPads on the road to be able to do police checks, new training in the way that we deal with counterterrorism et cetera, it's very hard for them to pick up and learn that and/or they're a lot slower about it. (Connor)

David made a similar argument. He aligned his enthusiasm and forward-thinking nature with the fact that he had grown up using technology:

> I think I've got into agriculture at a time where people are more accepting of the change that technology can bring and adapting to technology. I'd like to think that someone can say this about me one day, but some of these older blokes, "That's just not the way we need to roll. We never used to do that". They don't want to be a part of, or just don't trust the technology. They'd rather do it the old way, which is the hard way. I guess I'm part of a generation that can see the benefit in using that technology and understanding that technology. I am from a generation that has smartphones and computers and you're a bit more tech savvy. (David)

Avoiding risk

Although the Fourth Industrial Revolution brings exciting new opportunities, there is likely to be some disruption in the labour force (Frey and Osborne, 2017). While all participants agreed that technology would impact many industries in Australia, some subjectively believed that their own jobs would not be adversely affected and that they had therefore avoided any threat.

Occupations that require a high degree of interpersonal communication and contact are generally considered less susceptible to automation (Edmonds and Bradley, 2015; Frey and Osborne, 2017). Participants working in industries where the 'human touch' was paramount were certain that a machine could never do or take their job. Childcare worker Mandy, for example, was sure that her role would remain secure in the long term. As she explained, parents would always need to work and would therefore always need childcare. Similarly, Harley, a social worker, was adamant that his profession was safe because 'there will always be people needed to look after other people'. He went on to say:

> I think social work is pretty hard to automate and I think there will be a number of things that do go automatic, but you can't automate counselling, you can't automate social services, you can't automate going into a person's home and checking that their child is safe, you can't automate helping an intellectually disabled person with their work. You can't automate those things. So in that sense I would say it's probably pretty safe. (Harley)

Even if technology was already being used to some extent in their professions, participants argued that that human labour would remain central to the role. Nick, for example, described the idea of robots taking over the work of doctors as 'fantastical' because 'there's too much grey that no machine or tech will ever be able to do'. Likewise, police officer Justin pointed out that, while new technologies complemented the work undertaken by member of the police force, humans could never be substituted:

> We've started to use drones for missing persons or major events or hunting for wanted people and drugs and stuff like that. But a lot of it still comes down to legislative requirements that you have to have a human behind it all. So it has a point where it can't become fully automated. It can't become Robocop. (Justin)

Reducing risk

Participants working in sectors where job functions could be more easily automated tended to acknowledge a greater threat. Accountancy, for example, is facing dramatic transformation in the wake of pervasive computerisation. A range of software applications is now available that is able to complete tasks previously requiring the skills and knowledge of a trained professional (CEDA, 2015; Wisskirchen et al., 2017). Accountants Reuben and Anna described how they expected that their profession would undergo dramatic transformations. As Reuben said:

> With automation, I think they put out the studies where they're talking about everything that's going to become automated in the future. Like accountants over the next 50 years are at a 99

per cent risk of being replaced by robots. That's the industry itself... I know currently MYOB, one of the main accounting software providers, they're investigating ways that they can have their accounting software integrate straight into a tax return, which will completely eliminate the need for your accountant... I'm not sure when it's going to happen, but I fully do believe that the compliance side of accounting is probably going to be a dead industry in the future. (Reuben)

On the other hand, although the healthcare industry is generally considered robust, it is still experiencing dramatic changes. Bio-sensors, machine vision, and robotics comprise only a handful of examples pointing to various ways in which human labour is being replaced by machines (CEDA, 2015). Harry, a doctor, explained that technological advancements would inevitably reduce the work of specialists in some areas:

You have to be aware of what's changing in some specialties, such as cardiothoracics. As technology advances, a lot of other specialties are doing less invasive procedures with the same outcomes. (Harry)

Ruby and Maisie, both pharmacists, expressed concern that their jobs would dramatically change or disappear. This is because many Australian pharmacies are installing automated dispensers due to their increased efficiency in terms of improved accuracy and speed (AJP.com.au, 2016). As Maisie explained, machines were becoming commonplace and had already changed how pharmacists did their work:

Everything is going so crazy robotic-wise. We have robots dispensing right now in some community pharmacies, and I'm just scared that one day the pharmacy profession will just be replaced by machines. (Maisie)

A few participants who thought that digital disruption posed a potential threat to their career plans still remained confident in their ability to protect their ambitions. They planned to reduce the risk by identifying a niche in their industry that could not easily be automated. Harry, for instance, explained that his strategy would involve being aware of what medical specialities 'are dying out' and choosing a field that was more future-proof. Maisie, who expected that robots might take over dispensary in pharmacies, believed that, if she acquired more advanced clinical knowledge by doing a master's degree, she would more likely be able to remain in the industry. She explained:

Robots can't replace our clinical knowledge. I guess one day they might be able to, but at the moment it doesn't seem like they can. Say, if I have the clinical knowledge, that knowledge is my own, so it won't be replaced, or hopefully won't be replaced. (Maisie)

Accepting risk
Some interviewees believed that their jobs were probably going to be replaced by automation, and they accepted that eventuality. This capitulation, however, was not due to a particular sense of helplessness. If their jobs disappeared, these individuals were confident that they could alter their career story. They could not, or would not, protect themselves from risk, but their capacity to change and adapt their career identity – when the need arose – meant they

could still act as a self-determining agent. In sum, they possessed an outlook of career malleability. Although he did not have any post-school qualifications, for example, Elijah was very confident in his own abilities.

Working in a hotel, he felt that many of the tasks he performed at work could easily be automated and it was inevitable that, at some stage, his job would no longer exist. But he was not taking any steps to protect himself. Like the other participants who demonstrated an outlook of career malleability, Elijah believed that his strength and advantage lay in being willing and able to change career direction if the need arose:

> I feel that I'm mentally able to change... Say, if my current job becomes obsolete because there's a robot sitting there doing the exact same thing, which could happen, perfectly logically, I have no problem going out to a different job. (Elijah)

Discussion: facing uncertainty with confidence

Will technology ultimately supersede humans in the workplace? This is a question often debated in discussions surrounding the widespread uptake of automation and machine intelligence (Autor, 2015; Arntz et al., 2016, 2017; Borland and Coelli, 2017). Irrespective of the extent to which technological advancements will ultimately compromise employment opportunities, it is clear that many workplaces will be transformed.

A key finding from this investigation was that our participants were not concerned that an increased use of technology and automation in the workplace would jeopardise their own career plans. Although many acknowledged the likelihood of technological advancements changing how work was done in their chosen field, they remained subjectively confident in their ability to manage any potential career threat.

For many participants, this confidence was derived from a belief in their ability to adapt – regardless of whether they had a fixed future plan or were more flexible in their long-term outlook. We often hear that the workers of tomorrow must be 'adaptable' in order to survive ever-changing work environments. But as Pulakos et al. (2006) observe, work-related adaptability is an elusive term that can have multiple meanings. This is an issue we also observed. An 'adaptable' attitude enabled our participants to respond to career uncertainty, but this adaptability manifested in different ways. For some, it meant acquiring new skills to protect their aspirations; for others, it meant completely revising their goals. We therefore suggest that, when observing and describing this attribute as a work-related phenomenon, attention is required to ensure that the behaviour is accurately described. Moreover, when advising people that they must be 'adaptable' in order to manage the uncertainties of working in the 21st century, care is needed to operationalise the types of behaviours this 'adaptability' might entail.

Interestingly, some interviewees believed that 'adaptability' was a quality inherent to their generation. Whether speaking of a preparedness to improve skills or change their career plans, they contended that these abilities were a product of the environment in which they were socialised. This is an argument that reflects the concept of *reflexive habitus* (Sweetman,

2003). Bourdieu (1990) explains that habitus is a way of being that mirrors the individual's social background and influences how they respond to the world around them. For instance, Bourdieu (1990) also argues that a person's social class determines their habitual disposition. Their behaviours and reactions are learned from, and reinforced by, those with whom they have close social contact. While class may shape a person's habitual disposition, so too can their generational location, meaning that people who are born at the same time and are exposed to the same social influences can become 'embodied' in particular 'cultural dispositions' (Eyerman and Turner, 1998: 93). Because habitus can often reflect the strength of social structure, and reflexivity represents adaptability and change, the two concepts are sometimes considered incompatible (see Archer, 2009). Sweetman (2003), however, has suggested that reflexivity has itself become a dispositional feature of a particular social milieu characterised by habitual self-refashioning and self-transformation. He argues that amid rapid social changes and growing social uncertainties (such as changes in work patterns), the reflexive habitus will become more prevalent.
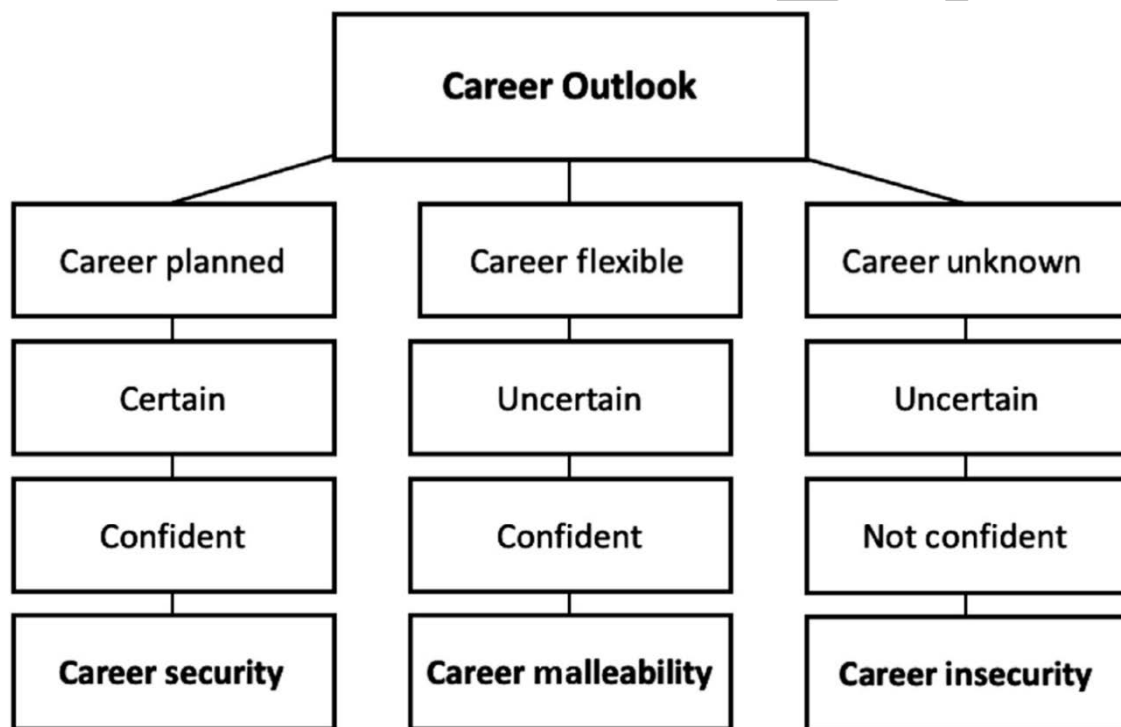

Figure 1: Observed differences between career security, career malleability, and career insecurity. Certain/Uncertain: Refers to the individual's certainty about what career trajectory they would likely follow. Confident/Not Confident: Refers to an individual's subjective evaluations regarding their ability to achieve a satisfying career outcome

Threadgold and Nilan (2009: 48) have made the argument that the reflexive habitus can enable successful negotiation of risk and maintain a sense of ontological security, thus constituting 'privileged cultural capital'. Our participants alluded to possessing a 'privileged cultural capital', but where Threadgold and Nilan (2009) have spoken of *material privilege* offered by class or socio-economic status, the research participants spoke of *reflexive privilege* offered by their age and generational location – one they believe equips them with

the skills and outlooks to better cope with any challenges that technological disruption will bring to the workplace. Determining the accuracy of this assumption would require further empirical investigation. Their subjective interpretations, however, provided these young people with an added sense of confidence in their ability to face the future.

We also propose that the concept of career malleability be included in theoretical understandings of how individuals maintain a sense of career confidence. Those who show career malleability cannot predict how their career story might unfold, but they are confident in their own ability to rewrite and refashion their career narrative if circumstances require. Zinn (2006) observes that we ordinarily think of uncertainty as something that one must manage and reduce. But he makes the case that, given contemporary social challenges, we must revisit our approach to uncertainty and be more accepting of it. Those participants in our study who demonstrated career malleability did just that: instead of taking steps to guard themselves against the unknown, or succumbing to ambiguity, they embraced it. Complementing and expanding upon existing theories (Giddens, 1991; Beck, 1992; Scillio, 2017), we suggest that career malleability represents a positive response to facing future career uncertainties. Individuals with a sense of career malleability believe that, for reasons that may be outside of their control, they may not be able to secure a future career plan. However, instead of experiencing anxiety, they remain confident in their own ability to navigate the unknown.

These findings offer opportunities for further theoretical and empirical research. We suggest that, in this era of manufactured uncertainties, a sense of *ontological malleability* signifies an adaptive approach to avoiding existential crisis by allowing the construction of a new sense of self. Ontological malleability could therefore be understood as having confidence in the face of future uncertainty, and the ability to rewrite one's biographical narrative and redefine the self when need demands. While not all people will have the capacity to exercise this malleability, some will. If this is the case, there would also be considerable value in identifying instances of people demonstrating ontological malleability and seeking to identify and understand the conditions under which this confident response to uncertainty thrives. If career malleability does indeed represent a positive and increasingly necessary adaptation to career uncertainty, how might such an outlook or set of strategies be nurtured? Remaining employable in this context will mean more than being trained in a certain field or discipline. It will mean developing a repertoire of personal attributes and outlooks that will enable an individual to adapt quickly and effectively to changing work environments.

Future investigations could also seek to quantify the patterns of behaviour observed here with a view to identifying their determinants and generalising them across other populations and contexts. For instance, not all people have the capacity to exercise an outlook of career malleability, but many do. If this is the case, there is value in identifying instances of people demonstrating this outlook and seeking to identify and understand the conditions under which this confident response to career uncertainty thrives. It would also useful to further explore the conditions under which some people respond differently to the use of automation in the workplace. It is possible, for example, that the characteristics of those who intend to adopt

technology and use it to improve their career prospects are different from those who would aim to avoid or reduce any threat that technological advancements bring to their career aspirations.

At a time when dramatic changes to many industries, jobs, and professions are being predicted, it is useful to document and understand how individuals are responding to the possibility of having their career plans disrupted. What we have found is a high degree of confidence among young people and a belief that they have the ability to manage uncertainty and embrace the opportunities and challenges that working in the 21st century presents. We have also found that some young workers are actively thinking about, and preparing for, a disruptive future of work. Such findings offer a great deal of promise and dampen scenarios around hopelessness in the face of disruption and change. But only the future will tell whether this level of confidence can be sustained over the long term.

Notes
1. In this context, the term 'career' refers to the individual's lifetime work trajectory, irrespective of the number of professions or jobs they have, or the gaps between them.
2. Participants considered to be 'active' had completed the Wave 5 (2015) or Wave 6 (2017) Our Lives survey.
3. For details about the Australian Qualification Framework, go to: https://www.aqf.edu.au/aqf-qualifications
4. This method is informed by the work of Charles S. Peirce. For an explanation of how it was developed, see Tavory and Timmermans (2014).

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Appendix 1: Analysis Summary

Pseudonym	Sex	Qualification	Current occupation/s	Career outlook	Technology response
Amber	F	Graduate Diploma	Teacher / Musician	Malleability	N/A
Amy	F	Bachelor's	Flight attendant	Security	Avoid
Anna	F	Bachelor's	Accountant	Security	Reduce
Maisie	F	Bachelor's	Pharmacist	Security	Reduce
Riley	M	Bachelor's	Engineer	Security	Avoid
Carter	M	Bachelor's	Journalist / Television	Security	Adopt
Alex	M	Bachelor's	Security analyst	Security	Adopt
Finley	M	Bachelor's	Physiotherapist	Security	Avoid
Jack	M	Bachelor's	Retail / Music composer	Security	Adopt
Freya	F	Bachelor's	Development consultant	Malleability	Accept
Maya	F	Bachelor's	PhD student	Security	Adopt
Molly	F	Bachelor's	Journalist	Security	Adopt
Nick	M	Bachelor's	Medical student	Security	Avoid
Harley	M	Bachelor's	Social work student	Security	Avoid
Mason	M	Bachelor's	Social worker	Security	Avoid
Sebastian	M	Bachelor's	Engineer	Security	Adopt
Charlotte	F	Bachelor's	Teacher	Security	Adopt
David	M	Bachelor's	Farmhand	Security	Adopt
Harper	F	Bachelor's	Paramedic student	Security	Adopt
Helen	F	Bachelor's	Nurse	Malleability	N/A
Imogen	F	Bachelor's	Insurance agent	Security	Avoid
Piper	F	Bachelor's	Speech pathologist	Malleability	N/A
Zara	F	Bachelor's	Nurse / Midwifery student	Security	Avoid
Aaron	M	Bachelor's	Engineer	Security	Adopt
Harry	M	Bachelor's	Medical intern	Security	Reduce
Reuben	M	Bachelor's	Accountant	Security	Reduce
Tyler	M	Bachelor's	Engineer	Security	Adopt
William	M	Bachelor's	Engineer / Farmer	Security	Adopt
Mandy	F	Diploma	Childcare worker	Security	Avoid
Justin	M	Cert IV	Police officer	Security	Adopt
Connor	M	Cert IV	Police officer	Security	Adopt
Zac	M	Cert III	Unemployed	Insecurity	N/A
Florence	F	Cert III	Stable hand	Security	Avoid
Layla	F	Cert III	Receptionist	Security	Reduce
Austin	M	Cert III	Retail	Malleability	Accept

Elliot	M	Cert III	Diesel fitter	Security	Avoid
Louis	M	Cert III	Electrician	Security	Adopt
Ruby	F	Cert III	Pharmacy student	Security	Reduce
Phoebe	F	None	Engineering student	Security	Adopt
Sienna	F	None	Science student	Security	Avoid
Chloe	F	None	Science student / Artist	Malleability	N/A
Isla	F	None	Unemployed	Insecurity	N/A
Lilly	F	None	Administration	Malleability	N/A
Blake	M	None	Real estate agent	Security	Avoid
Elijah	M	None	Hotel worker	Malleability	Accept
George	M	None	Self-defence instructor	Security	Avoid
Theo	M	None	Pizza delivery	Insecurity	N/A
Leo	M	None	Car detailer	Insecurity	N/A
Millie	F	None	Farmhand	Malleability	N/A
Jasmine	F	None	Retail	Malleability	Accept
Archie	M	None	Retail	Malleability	N/A

N/A: The participant had no plans to remain in an industry for the long term (10+ years); therefore, the issue of technology disrupting their own career aspirations was not addressed.