Empirical

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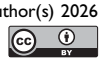

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Bounded Rationality in Career Choices: How Cognitive Biases Appear in Adolescent Career Exploration

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Abstract

Adolescents face high-stakes career decisions under uncertainty. Yet, while bounded rationality research has established that cognitive biases can systematically distort human judgement and decision-making, we know little about how these biases appear in adolescent career exploration. This pragmatic, mixed-methods study investigated how cognitive biases appear in career decision-making among 21 Australian high school students aged 15–18. Students participated in semi-structured interviews exploring their career decision-making approaches, followed by a quantitative survey assessing bias tendencies. Content analysis revealed several cognitive bias patterns: confirmation bias appeared as selective information seeking, availability bias emerged as choosing familiar careers, and varying levels of confidence and sunk-cost fallacy were observed. These findings highlight how biased thinking patterns can appear in adolescent career choices while acknowledging their potential benefits and limitations. Schools may benefit from incorporating bias-awareness activities into career education programs and teaching structured decision-making frameworks.

Keywords

career decision-making, cognitive biases, adolescent development, career education, mixed-methods research, high school

The decisions adolescents make about their careers shape their life trajectories, such as their future career prospects, job satisfaction, and overall well-being (Hartung, 2011). Yet, only 25% use systematic approaches to make these decisions (Bimrose, 2006; Eccles, 2009). People often have

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limited information about themselves (i.e. their strengths and areas for improvement) and about the world of work. Hence, many individuals rely on intuition or mental shortcuts (heuristics) instead of systematic reasoning for career decisions (Gati & Kulcsár, 2021). This aligns with the concept of bounded rationality: people make 'good enough' rather than optimal decisions due to limited information, cognitive capacity, and time (Simon, 1990). Although heuristics can lead to efficient and accurate decision-making in practised, predictable situations (Gigerenzer & Gaissmaier, 2011; Kahneman & Klein, 2009), they can also be riddled with cognitive biases or systematic errors in thinking (Kahneman, 2011; Stanovich et al., 2012). Recent career theories suggest that we need to consider the prevalence and consequences of these heuristics and biases in career decision-making (Gati & Kulcsár, 2021; Lent & Brown, 2020).

Career Decision Theories Have Evolved From Matching to Adapting

Early career theories have focused on matching individual interests and skills to work environments (Holland, 1973; Parsons, 1909). However, these models assumed linear and stable career pathways. Contemporary frameworks recognise the impacts of uncertainties on career trajectories (i.e. Happenstance Learning Theory; Krumboltz (2009); Chaos Theory of Careers; Pryor & Bright, 2014), shifting focus from finding optimal career-person matches toward adaptive decision-making processes in unpredictable work environments (Xu, 2023).

This shift towards adaptive career decision-making parallels bounded rationality theory (Simon, 1990), which suggests people settle for *good enough* decisions rather than the *most optimal* decision due to limited information and cognitive capacity (Simon, 1990). Human judgement operates through two thinking processes: automatic heuristics (System I) and deliberate reasoning (System II; Tversky & Kahneman, 1974). System I thinking is associated with cognitive biases, which are systematic errors in thinking, while System II is associated with normatively correct responses (Tversky & Kahneman, 1974). However, contemporary career perspectives acknowledge that both intuitive and rational processes are necessary for effective career decision-making (Gati & Kulcsár, 2021; Lent & Brown, 2020). Understanding how these cognitive capabilities develop during adolescence is crucial, as this is when adolescents first encounter significant career decisions.

Decision-Making Skills Are Growing in Adolescence, but Cognitive Biases Can Still Influence Their Decisions

Adolescence marks a critical period for cognitive development, with increased abstract thinking and problem-solving abilities (Blakemore & Robbins, 2012). This naturalistic cognitive development is reflected in career exploration patterns from childhood to adolescence. For instance, children progressively narrow career options based on gender stereotypes (ages 6–8), social valuation (ages 9–13), and personal interests (ages 14+; Gottfredson, 1981). This evolution from broad consideration to deeper, more focused career exploration aligns with cognitive development trajectories. Adolescents have the cognitive resources for rational decision-making comparable to adults (Aïte et al., 2018; Toplak & Flora, 2021), with bias resistance peaking during middle adolescence (ages 14–16; Toplak & Flora, 2021). However, adolescents typically lack systematic reflection models and struggle to recognise their own limitations, often screening options without considering alternatives, risks, or seeking advice (Toplak & Flora, 2021). This emerging cognitive capability makes middle adolescence a critical window for interventions to effectively process information, especially as they start to explore career options and make educational decisions.

Unlike other decisions that adolescents make (e.g. navigating peer relationships), career decisions pose unique challenges (Gati & Kulcsár, 2021). They vary in scope, from multiple alternatives (i.e. choosing university degrees) to binary choices (i.e. accepting a promotion), and in the permanence of their consequences. Some career decisions are predictable milestones (i.e. post-school choices), while others emerge unexpectedly (e.g. responding to redundancy). High school students' first career decision is especially challenging, as they face multiple alternatives with varying long-term consequences (Gati & Kulcsár, 2021).

Several cognitive biases have been identified as relevant to career decision-making (Gati & Kulcsár, 2021; Lent & Brown, 2020; Todd, 2021). The Content-Process-Context (CPC) model acknowledges that biases and heuristics can interfere with career decision-making across three domains (Lent & Brown, 2020). For example, confirmation bias causes individuals to seek information that confirms their pre-existing career beliefs while ignoring contradictory evidence (Nickerson, 1998). Anchoring bias leads to an over-reliance on initial impressions (Furnham & Boo, 2011), while availability bias may limit their career options based on easily available information, such as typical career choices in the family (Kahneman, 2011). The sunk-cost fallacy (Strough et al., 2011) keeps individuals invested in unsuitable career paths simply due to prior investment, while overconfidence bias may lead to unrealistic expectations (Dunning et al., 2004).

Beyond these cognitive biases, emotional and social factors further complicate adolescents' career decision-making process (Fouad & Bynner, 2008). Adolescents' perceptions of viable career options are shaped by parents (Bisson & Stubley, 2017; Keller & Whiston, 2008) and teachers (Paa & McWhirter, 2000). Families may encourage or discourage certain career paths based on their own experiences, values, or perceptions of prestige (Keller & Whiston, 2008), while social class affects access to work experiences or internship opportunities (Duffy et al., 2016). Gender stereotypes influence the range of careers adolescents consider (Islam et al., 2021; Lent et al., 2001; Skatova & Ferguson, 2014), while herd mentality can lead to suboptimal career choices based on social pressure (Banerjee, 1992; Kurdi, 2021). These factors underscore the need for comprehensive career support that addresses both psychological and contextual factors in adolescent career decision-making

Empirical and Practical Gaps

There is an empirical and practical gap in the lack of attention to cognitive biases in career decision-making, despite evidence that debiasing training can effectively reduce biases and improve decision-making (e.g. Swaryandini et al., 2025). Although theoretical models have recognised that patterns consistent with cognitive biases such as confirmation bias, availability bias, and overconfidence can appear in career decisions (Gati & Kulcsár, 2021; Lent & Brown, 2020), empirical research examining how these biases appear in adolescent career exploration remains limited. Australian government initiatives, such as Future Ready (Department of Education, Skills and Employment, 2019) and the Australian Blueprint of Career Development (Miles Morgan Australia, 2010), recommended embedded career guidance throughout the curriculum, while emphasising practical work experiences and systematic decision-making training (Christensen & Søgaard Larsen, 2011). However, Australian teachers and students report that the current career education remains overly focused on matching students to the 'right' career rather than developing decision-making skills (Shergold et al., 2020). A dynamic and uncertain world requires flexible decision-making skills, including nonlinear thinking and adaptability to manage career uncertainties (Pryor & Bright, 2014). Australian schools rarely teach these decision-making skills or address how biases might affect career decisions (Shergold et al., 2020). This study addresses this gap by directly investigating how cognitive biases appear in

adolescents' naturalistic career decision-making processes, particularly in the Australian context. While these thinking patterns may function as either systematic errors or adaptive heuristics depending on context, understanding how they appear in adolescents' naturalistic career decision-making can inform more effective career guidance.

Research Aims and Questions

Studying these biases in adolescent career decision-making presents unique methodological challenges. It is impossible to establish the 'ground truth' of 'decision quality' for adolescent career decisions, making it difficult to solely rely on quantitative assessments of bias. Therefore, this study employs a mixed-methods approach with a dominant qualitative component.

Based on bounded rationality and the Content-Process-Context model, this study addressed:

1. What cognitive bias patterns appear in adolescents' descriptions of their career decision-making processes?
2. How do adolescents perceive these cognitive bias patterns to show up in their career exploration and choices?
3. How do social influences and contextual factors co-occur with cognitive biases in adolescents' career decision-making?
4. How do students perceive current career guidance approaches in addressing cognitive aspects of career decision-making?

By investigating these aspects through an integrated approach, the study addresses a significant literature gap by empirically testing how cognitive bias patterns appear in real-world career decision-making processes of Australian adolescents, bridging theoretical decision-making models with applied career contexts.

Methods

Research Design and Analytical Approach

This study was registered with the Human Research Ethics Committee (2022-HE002036 PIL). This study was not pre-registered. This study employed a convergent mixed-methods design grounded in a pragmatist paradigm, combining qualitative content analysis with a quantitative survey. This approach enabled us to examine both the process of career decision-making (qualitative) and the presence of specific cognitive biases (quantitative), providing complementary insights into this complex phenomenon (Creswell & Plano Clark, 2017). We adopted a concurrent triangulation design (Creswell & Plano Clark, 2017), where qualitative and quantitative data were collected during the same phase, analysed separately, and then integrated during interpretation. The qualitative component served as the dominant method, with the quantitative survey providing complementary data (QUAL+quan).

We selected content analysis as the primary method rather than thematic analysis because content analysis allows systematic identification of specific phenomena (cognitive biases) while maintaining flexibility to discover emergent patterns (Elo & Kyngäs, 2008; Krippendorff, 2018). To complement and triangulate the qualitative findings, we administered a brief survey after each interview. Addressing cognitive bias susceptibility requires having standardised reliable measures (Berthet, 2021b), but published cognitive bias measures are often generic and provide limited information about cognitive biases in context-specific decision-making (Berthet, 2021a). Thus, we developed a brief measure of cognitive biases in career decision-making context. Where there

are divergences between self-reported survey responses and interview discussions, we view these as opportunities for deeper interpretation rather than contradictions.

Participants and Data Collection

We recruited 21 high school students (ages 15–18, year 10–12) using convenience sampling for individual interviews due to time and funding constraints. 9 to 17 interviews would suffice to achieve qualitative saturation (Hennink & Kaiser, 2022). We initially used Facebook ads to recruit students from all over Australia, but only managed to recruit two students after two months. We reached out to six local public schools in a major city in Australia and managed to recruit 16 students through one public selective school. Participants under 18 were required to have a signed consent form from a parent or guardian. More information about the participant demographics is presented in Table 1.

The main author conducted and recorded all the interviews via Zoom using the built-in function. All participants presented themselves, and no participants withdrew. Participants received $20 gift vouchers and completed a brief survey afterwards. Interviews lasted between 45 and 60 minutes and were conducted between September and December 2023. The full list of interview questions is listed in Appendix A.

Instrument Development and Data Analysis

Interview Protocol and Survey Development. The semi-structured interview protocol and quantitative survey were developed collaboratively based on both theoretical frameworks and practical career

Table 1. Interview Participants' Demographic Information

ID	Age	Grade	Gender	Pseudonym
1	16	11	Female	Sarah
2	17	11	Male	James
3	17	11	Female	Maya
4	17	11	Female	Emma
5	16	10	Female	Sophie
6	16	10	Female	Janet
7	18	12	Male	Ben
8	18	12	Male	Thomas
9	18	11	Male	Ethan
10	15	10	Female	Olivia
11	17	11	Female	Elle
12	16	10	Male	Jett
13	16	10	Female	Nadine
14	18	12	Male	Daniel
15	16	11	Female	Jess
16	16	10	Female	Maria
17	16	10	Male	Alex
18	16	10	Female	Zara
19	18	12	Female	Aisha
20	17	11	Female	Lily
21	17	11	Female	Nina

guidance considerations (Alvesson & Skoldberg, 2017). The lead researcher conducted a comprehensive literature review of cognitive biases in decision-making (Kahneman, 2011; Stanovich et al., 2012) and career decision theories (Gati & Kulcsár, 2021; Lent & Brown, 2020), identifying five cognitive biases most relevant to career decisions: confirmation bias, availability bias, anchoring bias, overconfidence bias, and sunk-cost fallacy. The research team (experts in cognitive biases, developmental and educational psychology, education, and psychological research methods) then developed semi-structured interview questions, organised to build rapport before addressing sensitive topics (Jacob & Furgerson, 2015).

The team also drafted a survey consisting of 2–3 items per cognitive bias. The final survey consisted of nine items representing different cognitive biases in career decision-making contexts (e.g. Confirmation bias: *'I have actively searched for information that contradicts my first choice career'*). Participants rated their level of agreement on nine statements using a Likert scale (1 = strongly disagree, 5 = strongly agree). For the present study, the survey demonstrated acceptable internal consistency ($\alpha = 0.78$) and inter-item correlation ($r = 0.29$), suggesting the items cohered as a measure of bias tendencies while capturing distinct aspects of decision-making.

Data Analysis. We transcribed the interviews using MacWhisper (v6.11, 'medium' English language model; Bruin, 2023) to create verbatim transcripts, which were then manually edited for typographical errors. We selected whole interview transcripts as our unit of analysis (Polit & Beck, 2004), which allowed us to maintain contextual integrity while examining both explicit statements and underlying meanings. We developed a structured categorisation matrix based on theoretical frameworks of cognitive biases in career decision-making (Gati & Kulcsár, 2021; Kahneman, 2011; Lent & Brown, 2020).

We employed a two-stage coding process. First, we used an artificial intelligence (AI) large language model, Claude.ai (Anthropic, 2024), to generate initial codes based on our categorisation matrix. AI-assisted analysis has shown to enhance the methodological integrity (Siiman et al., 2023) and reduce project time by 120 hours and costs by USD$1,500 (Parker et al., 2023). While AI-assisted analysis has some limitations, including possible bias and inaccurate interpretation (Christou, 2023), we mitigated these concerns by conducting our analysis in compliance with the university's AI usage policy and privacy protocols. No personally identifiable information was shared externally, and all data handling adhered to approved ethics protocols. Two researchers independently validated AI-generated codes against original transcripts, resolving discrepancies through consensus. We then organised the codes into themes and subthemes, verified by the research team.

The quantitative survey data were analysed using descriptive statistics in R (Core Team, 2021), employing descriptive statistics, psychometric analyses, including Cronbach's alpha for internal consistency, and inter-item correlations. We also visualised the data on a Likert plot (see Figure 1) to examine response distributions across different cognitive bias categories, with responses converted to a weighted scale from −2 (Strongly Disagree) to +2 (Strongly Agree) to interpret the participants' bias tendencies. Due to confidentiality, the data and analysis code for this study are unavailable.

Trustworthiness and Reflexivity

The research team represented diverse disciplinary backgrounds relevant to understanding adolescent career decision-making. The lead researcher is a psychologist with over 7 years of experience working with adolescents, whose interest in this topic stems from observing clients who confined themselves to unsuitable career paths. Throughout this study, she remained mindful

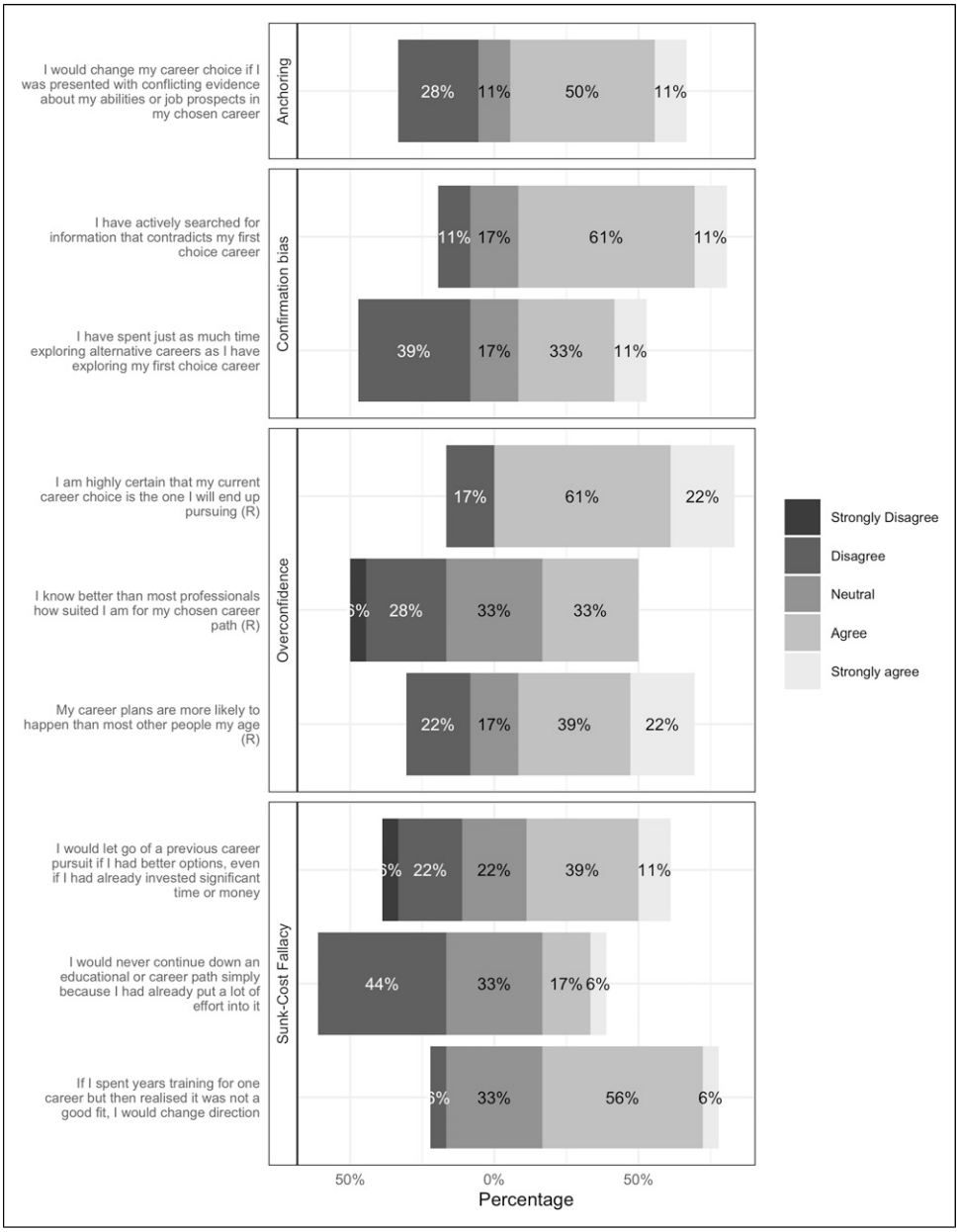

Figure 1. Cognitive bias tendencies in career decision-making among Australian high school students (n = 18)

to consider cognitive biases not merely as thinking errors but as complex psychological mechanisms.

To enhance rigour, we (1) documented methodological choices transparently, (2) grounded interpretations in data using extensive quotes, (3) had a second researcher audit ~25% of codes, and (4) triangulated coding against AI output and quantitative survey findings. We established

mixed-methods legitimacy through methodological triangulation between qualitative and quantitative findings.

Results

Qualitative Interviews

Several key themes emerged regarding career decision-making processes and influential cognitive biases. Although most students (71%) were not explicitly aware of cognitive biases, they could identify how cognitive biases could appear in career decision processes after being given a brief explanation and example. Students also reflected on the current support they received from schools and identified how schools could improve career guidance.

Important Factors that Are Considered in Career Decisions. Participants identified several key factors influencing their career choices, including passion and interest ('*I think number one would have to be whether or not I'll be happy 20 years into the job*' – Janet), financial stability (*'Maybe just financial security'* – Alex), social influences (*'My mom is my biggest influence'* – Elle), desire for positive impact (*'What I can actually do to change the world'* – James), and work-life balance ('*I think a big focus is the ability to have work and life balance'* – Maya). These factors interacted and sometimes competed in participants' decision-making processes.

How Cognitive Biases Appear in Career Decision-Making Processes. When participants were explicitly asked about cognitive biases, only six participants (29%) had prior knowledge of cognitive biases from philosophy classes. After receiving a brief explanation about cognitive biases, many could identify how cognitive biases can appear in career decision-making processes.

Confirmation Bias. Most participants showed limited systematic exploration of contradictory evidence about their chosen careers. One participant (5%) demonstrated deliberate efforts to seek more rounded information, while most focused on finding confirming information. Elle reflected: *'There are many factors in medicine that could definitely prove that I'm not suitable for it. I just haven't looked for those factors yet'*.

Anchoring Bias. Five participants (24%) showed limited and idealised career views based on initial impressions, focusing primarily on the career positives. Sarah shared, '*I envisioned [being in the army] to involve a very physical lifestyle where I get to help people…I didn't want to just sit behind the desk all day and do paperwork*'

Availability Bias. Ten participants (48%) identified how cultural and social influences can shape career choices, as illustrated by Jess (aspiring nurse): '*Most of my friends are Asian, so they all went for the medical route. I guess it's influenced by their family mostly rather than their own decision*'

Sunk-Cost Fallacy. Nine participants (43%) were willing to change paths if their career plan was no longer viable ('*If I don't think that the career is for me anymore, then I don't want to be spending the rest of my life miserable*' – James). Five participants (24%) reported they would be open to exploring other pathways if someone they trust (e.g. a close family member or a teacher) gave the recommendations ('*If they know me well, then I would give it a good think*' – Maya). However, few participants demonstrated stronger resistance to change ('*Probably*

nothing at this point. Because I've set my mind on it and I'm already halfway on the start of the track' – Jess).

Calibration of Confidence. Participants showed varying confidence levels. One (5%) expressed 100% confidence ('*100%. I feel like I can do it in a really good way*' – Aisha), three showed high confidence levels (85–99%), but acknowledged external factors ('*98%. The missing two percent is for unwanted events that are out of my control*' – Elle). 11 participants (52%) expressed moderate confidence levels (60–80%), citing academic concerns and potential changes in their interests or goals ('*Probably 78%. If my ATAR is a lot higher than I thought it would be, I think I'll do medicine and if it's a lot lower than it is, I'll find something else'* – Sarah).

Limitations of Current Career Guidance in Schools. Most participants reported dissatisfaction with the value and quality of support at schools. Twelve participants (57%) had completed career assessments, but many found them unhelpful or too simplistic (*'I think all of my strengths are kind of useless because I had one which was appreciation for aesthetics…I don't know what I could use that for'* – Lily). Participants also noted insufficient exposure to non-traditional career paths and success stories (*'Probably also celebrating people that make achievements in different areas, not just your kids that are going off getting university degrees'* – Emma). Five participants (24%) highlighted problems with program delivery, suggesting the sessions need to be *'more casual instead of just reading off the PowerPoint…and for the teachers to be also a little bit more interested in it'* (Olivia). Three students acknowledged that although the school advertised career programs, they opted out either due to time constraints or did not find value in career support (*'I don't think whether or not I'm going to be able to get into medical school or be able to get into this profession is really affected'* – Alex).

Quantitative Survey

Out of 21 participants, 18 completed the survey. Figure 1 highlights the proportion of participants' responses to the statements. Most participants (83%) were highly certain about their current career choice yet showed openness to change when presented with conflicting evidence. In contrast to the qualitative interviews, most participants (72%) agreed that they actively searched for contradictory information, but fewer participants (44%) had spent as much time exploring alternative careers. There were also some interesting patterns in the sunk-cost fallacy. Most participants (62%) were willing to change direction if their initial career choice was not a good fit. Only a few participants (23%) would continue down a path simply because they have invested effort. Most (61%) felt their career plans were more likely to happen than their peers. However, participants were almost equally divided in that they knew better than professionals about their career suitability. These findings suggest that participants were generally confident in their career choice, but they maintain a willingness to change course when necessary. See Table 2 for the comparison between quantitative and qualitative findings.

Table 2. Joint Display of Qualitative and Quantitative Findings on Cognitive Biases in Career Decision-Making

Cognitive bias	Qualitative evidence (n = 21)	Quantitative evidence (n = 18)	Interpretation
Confirmation bias	Most participants showed limited systematic exploration of contradictory evidence. Only 1 participant (5%) deliberately sought balanced information *'There are many factors in medicine that could definitely prove that I'm not suitable for it. I just haven't looked for those factors yet'* (Elle)	• 72% agreed they actively searched for contradictory information • 44% reported they spent as much time exploring alternative careers as their first choice	Divergence: Self-reported contradiction-seeking (72%) exceeded behaviours reported in interviews (5%). Students may count any forms of alternative career exploration as 'active search for contradictory information', even when not systematic
Anchoring bias	Five participants (24%) demonstrated idealised career views based on initial impressions, focussing primarily on positive aspects while overlooking practical realities *'I envisioned [being in the army] to involve a very physical lifestyle where I get to help people...I didn't want to just sit behind the desk all day and do paperwork'* (Sarah)	• 61% would change career choice if presented with conflicting evidence about abilities or job prospects	Partial convergence: Survey results showed openness to revising their choices when faced with conflicting evidence, while interviews revealed how initial impressions shaped ongoing information processing. Patterns resembling anchoring bias appeared in some students' idealised views, though many remained open to change
Availability bias	Ten participants (48%) identified how cultural context and social proximity shaped their career awareness and choices *'Most of my friends are Asian, so they all went for the medical route. I guess it's influenced by their family mostly rather than their own decision'* (Jess, aspiring nurse)	N/A	QUAL only: Students identified how family professions and peer choices may limit their career exploration. These patterns seem consistent with availability bias, where they lean more towards career options that are more familiar

(continued)

Table 2. (continued)

Cognitive bias	Qualitative evidence (n = 21)	Quantitative evidence (n = 18)	Interpretation
Confidence calibration	Confidence levels varied: 1 participant (5%) expressed 100% confidence; 3 (14%) showed 85–99% confidence; 11 participants (52%) expressed moderate confidence (60–80%), citing academic concerns and potential changes in interests '*100%. I feel like I can do it in a really good way*' (Aisha)	• 83% were highly certain about current career choice • 61% felt their career plans were more likely to happen than their peers • Participants were equally divided on whether they knew better than professionals about career suitability	Convergence: Both methods show generally high confidence. However, high confidence coexisted with openness to change. Rather than simple overconfidence, these patterns may reflect sophisticated metacognitive awareness
Sunk-cost fallacy	Nine participants (43%) expressed willingness to change career paths. Five participants (24%) would be open to change if trusted advisors recommended it. Few showed strong resistance to change despite prior investment *'Probably nothing at this point. Because I've set my mind on it and I'm already halfway on the start of the track'* (Jess)	• 62% willing to change direction if initial choice is not a good fit • Only 23% would continue down a career path simply because they had invested effort • 56% would change direction if training revealed poor fit	Convergence: Most students maintain adaptability despite already being invested in their career choice. Resistance patterns consistent with sunk-cost thinking appeared relatively infrequently at this developmental stage, possibly because actual investments (time, money, identity) are still limited

Note. Pseudonyms used for participant identifiers. Survey response percentages represent combined 'Agree' and 'Strongly Agree' responses unless otherwise noted. Divergences between qualitative and quantitative findings reflect differences between self-reported tendencies and naturalistic behaviours reported in the interviews.

Discussion

This mixed-methods study explored how cognitive bias patterns appear in Australian high school students' career decision-making. Consistent with contemporary career frameworks (Gati & Kulcsár, 2021; Lent & Brown, 2020), findings revealed cognitive bias patterns in students' career decision-making processes. Many students rely on initial impressions (resembling anchoring bias) and readily available information from their environment (akin to availability bias), consistent with System I (fast, heuristic-driven) thinking (Kahneman, 2011; Simon, 1990). Additionally, patterns resembling confirmation bias appeared in information gathering (content), while confidence calibration can manifest during information evaluation (process), and stereotyping shapes environmental perceptions (context), consistent with the Content-Process-Context (CPC; Lent & Brown, 2020) framework. Schools play a vital role in this process, but many participants felt their schools did not provide adequate practical guidance. As Nina noted, *'I feel like school does touch on it briefly, but not extremely in detail'*.

Factors Influencing Adolescents' Career Decisions

Five primary factors influenced adolescents' career decisions: (1) passion and interest, (2) financial stability, (3) social influences, (4) desire to help others, and (5) work-life balance. Most participants prioritised both passion/interest and financial stability, aligning with previous findings (Akosah-Twumasi et al., 2018; Shoffner et al., 2015). Family background and cultural expectations also emerged as influential factors. While adolescents generally value their parents' opinions (Keller & Whiston, 2008) and work values (e.g. beliefs around engaging in caring vs. well-paid work; Lent & Brown, 2020), inherited work values can often clash with personal interests (Ma & Yeh, 2005).

Patterns Resembling Cognitive Biases Appeared in Students' Career Decision-Making Process

Students' responses in the qualitative interviews revealed thinking patterns resembling cognitive biases, consistent with the CPC model (Lent & Brown, 2020). In the content domain, confirmation, anchoring, and availability bias thinking patterns appeared during information gathering. Most participants in the interviews focused on confirming information rather than systematic exploration, with only one student deliberately seeking rounded information. This conflicts with survey findings showing 72% claimed to search for contradictory information, possibly reflecting a broad interpretation of survey wording (*'I have actively searched for information that contradicts my first career choice'*). Students might consider any exploration of alternative careers as 'searching for contradictory information', even if this exploration was not systematic. Alternatively, the semi-structured nature of the qualitative interview may not have prompted explicit consideration of disconfirming evidence seeking. Patterns consistent with availability bias suggest students may choose careers based on examples that easily come to mind from their environment (Polenova et al., 2018), while anchoring bias patterns appear as reliance on first career information or idealised views. These limited views can create information deficits where initial impressions prevent thorough career exploration (Gati & Kulcsár, 2021).

In the process domain, the relationship between confidence and adaptability in career planning emerged as a complex theme. Approximately 50% of participants expressed moderate confidence (60–80%) in their career plans, yet the survey showed 61% believed their career plans were more likely to succeed than their peers. While high confidence can fuel motivation and persistence, it is important to consider how students balance this with adaptability. Interestingly, both the interview and the survey suggested many students simultaneously show high confidence and actively open-minded thinking (AOT; Baron, 1993), maintaining strong convictions while remaining open to change (Emlen Metz et al., 2020). This finding diverges from theoretical predictions that high confidence typically correlates with resistance to change (e.g. Jermias & Hoi Hu, 2020), suggesting adolescents may be developing sophisticated metacognitive abilities allowing strong convictions alongside adaptability (Moses-Payne et al., 2021).

In the context domain, stereotyping and groupthink shaped career considerations through peer and cultural expectations (e.g. *'Most of my friends are Asian, so they all went for the medical route'* – Jess, aspiring nurse). Stereotyping toward certain careers can narrow perceived options as students avoid stigmatised or socially discouraged paths (Akosah-Twumasi et al., 2018; Wang et al., 2022), illustrating how biased thinking patterns can be reinforced through social and cultural influences within the CPC framework.

Implications

Theoretical Implications. Our findings support and extend both the Dual-Process Theory (Tversky & Kahneman, 1974) and the CPC model (Lent & Brown, 2020) by illustrating how systematic cognitive biases intersect with each CPC domain. A key finding is the intersection between cognitive biases and social/cultural contexts – how biases manifest appears strongly related to cultural background, family expectations, and peer groups. This suggests interventions addressing cognitive biases in career decisions could consider cultural aspects rather than treating biases as purely individual phenomena. Moreover, although theories predict that heavy reliance on intuitive judgments (System I) can lead to high confidence, many students indicated they were willing to change despite their high confidence levels, suggesting a more complex interplay between confidence and adaptability.

Practical Implications. Students suggested three areas for improvement in career education: less focus on grades and more focus on broader career values, more diverse career exposure, and bias-awareness training. These suggestions translate into the following recommendations for career counsellors and educators. First, schools should provide structured exposure to unconventional career pathways. Participants noted such experiences helped them develop more realistic work perspectives (‘*I saw that you have to give up quite a lot, like your family’* – Nina, medical profession shadowing). Career counsellors could facilitate short-term job-shadowing in diverse professions and showcase atypical career trajectory stories (e.g. those who have pivoted to other industries or did not go straight to university) to counter availability bias.

Second, career guidance should shift from grade-focused and interest-matching to address broader work values and decision-making processes. Participants wanted more engaging, personalised support that acknowledged their circumstances. Counsellors could implement bias-awareness activities integrated into career planning sessions. For example, students could map where their career ideas originated (revealing availability biases), seek information to challenge or disprove their career ideas (addressing confirmation bias), or use structured decision frameworks that prompt systematic exploration rather than confirming their pre-existing preferences. Research on debiasing training suggests feedback loops are critical (Swaryandini et al., 2025), thus students benefit from checking their initial career assumptions against new information, receiving feedback or challenge on their career thinking, and reflecting on whether they have thoughtfully considered other options.

Finally, while this study focused on school-based guidance, parental support is also critical. Schools could encourage parents to allow exploration beyond family-typical paths, provide resources on how to support their child’s career decision-making, and model openness to career changes. This multi-level approach (i.e. combining bias awareness, structured exploration, practical exposure, and family engagement) could address the gaps students identified while supporting more adaptive career decision-making.

Study Limitations

Several limitations should be considered. Firstly, identifying cognitive biases in career decision-making is complex. Some thought processes appearing as systematically biased could function as adaptive heuristics (Gigerenzer & Gaissmaier, 2011). For example, relying on readily available career examples from immediate environments could be adaptive information gathering from trusted sources. What appears as confirmation bias might reflect metacognitive limitations. Students may not actively seek disconfirming information because they do not know what information they are missing. This nuance was present when integrating qualitative and quantitative

findings, particularly where the findings diverged (i.e. 72% reported actively searching for contradictory information in the survey, yet only 5% reported exploring balanced views in the interview). We viewed these divergences as complementary insights into different facets of decision-making (i.e. self-reported tendencies versus naturalistic behaviours) rather than contradictions. Future research could consider running longitudinal studies to distinguish between beneficial heuristics and limiting cognitive biases in career decision-making process by tracking career decision approaches and outcomes over time.

Our sampling approach also likely attracted reflective, high-achieving participants, with 76% participants coming from one selective school. Students from less competitive environments might demonstrate different cognitive patterns and career decision challenges that warrant further investigation. Future research should employ random sampling methods or recruit participants who are less proactively engaged in career planning. Moreover, our findings reflect the specific educational and cultural context of Australian students in metropolitan cities. Although participants came from diverse cultural backgrounds, cultural influences on cognitive biases in career decisions warrant dedicated comparative studies across demographic groups and geographic locations.

Methodologically, while AI-assisted analysis could enhance coding reliability, this novel approach requires further validation in qualitative research contexts. To ensure analytical integrity, we validated all AI-generated codes through independent human review by two researchers, conducted analysis in compliance with the university's AI usage policies, and maintained strict privacy protocols by not sharing personally identifiable information externally. Moreover, virtual interviews may have limited the candid disclosure from participants, and the brief survey's lack of prior validation limits the robustness of quantitative findings. Future research should validate robust measurement tools specifically designed for measuring cognitive biases in career decision-making contexts.

Conclusion

This study investigated Australian high school students' career decision-making processes, identifying key influential factors (personal interest, financial stability, social influences, impact motivation, and work-life balance) and mapping cognitive patterns across Content-Process-Context dimensions. Qualitative data revealed patterns consistent with confirmation bias, availability bias, and anchoring bias, though we acknowledge these may function as either systematic errors or adaptive heuristics depending on context. Students demonstrated nuanced relationships between confidence and adaptability while expressing dissatisfaction with available career guidance programs. Findings suggest career guidance programs could consider embedding systematic cognitive tools for career decision-making. Just as we teach adolescents how to drive, not by dictating their destinations but by developing their navigation skills, career education needs to equip students with cognitive tools to recognise cognitive biases, explore diverse paths, and adapt to unexpected roadblocks. When adolescents better understand how their minds make these consequential decisions, they gain something more valuable than a 'perfect career' choice: the ability to navigate an unpredictable future with confidence, resilience, and purpose.

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Ethical Considerations

This study was approved by the Human Research Ethics Committee (approval number: 2022-HE002036 PIL). This study was not pre-registered.

Author Contributions

Conceptualisation: GS, MN, PP, CN, GB, and JT; Methodology: GS, MN, PP, CN, GB, and JT; Analysis: GS and MN; Writing – original draft preparation: GS and MN; Writing – review and editing: GS, MN, JT, PP, CN, and GB; Supervision: MN, PP, CN, GB, and JT.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

The data and analysis code of this study are not available due to data confidentiality.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the author(s) used Claude.ai to assist with qualitative data analysis and manuscript draft preparation. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Supplemental Material

Supplemental material for this article is available online.

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