


Research

A structural equation model analysis of the relationships between career indecision, sense of control, self-efficacy, rumination and depression in high school students

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Abstract

This study examined the links between career-decision making and mental health. Levels of career indecision, rumination, general self-efficacy, sense of control, and depression in 275 high school students were assessed. Anonymous responses to five valid and reliable scales were analysed using structural equation modelling. A conceptual model was postulated and tested for goodness of fit. The results yielded that perceived external constraints acted as a significant mediator between career indecision and depression. Ruminative brooding significantly moderated the link between career indecision and perceived external constraints. The structural equation analysis on the adjusted model demonstrated an overall good model fit. The study highlights the intricate linkages and effects between students' career decision making, thinking patterns, perceptions of external barriers, and mental health. Levels of depression and career indecision are heightened in the present study. The mechanistic model and associated findings of the study support the necessity of providing targeted interventions for high school students that concurrently address mental health concerns alongside career-decision making, whilst also ameliorating problems associated with self-efficacy, perceived barriers, and negative thought patterns.

1 Introduction

Career-decision making, and mental health are connected, even though they are often treated as distinct areas of concern [1]. The career-decision making process is part of the major transitional process involved in young adulthood. During senior high school years, deciding on a career becomes increasingly emphasised, at a time where students may assess their capabilities by the subjects they study, their sense of direction, or perception of success [2, 3]. Any resulting pressure and confusion may build a perceived sense of reduced capability, thereby reducing the sense of general self-efficacy, and placing additional stress on the school leaver [4, 5]. Multiple researchers have pointed out the need for more empirical research into the connections between career-decision making, career self-efficacy and mental health factors. There has also been a call to recognize the need for integration between personal and career counselling as well as for preventative interventions that tackle both career-decision making and mental illness [1, 6, 7]. There is evidence to indicate that the lack of integration in research focus on mental health and vocational-decision making suggests a failure to recognise the emotional, cognitive significance of the career-decision making process for an adolescent in their transitional journey

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from school to work [1, 6, 8, 9]. As there is increased external pressure on school leavers to decide what to do next, this may result in increased anxiety, stress, or negative thoughts, and ultimately may trigger depressive symptoms [10, 11].

The current study was situated within the context of New Zealand high school students approaching the transition from school, and aimed to explore levels of depressive symptomatology, rumination and career indecision, whilst also investigating the linkages and effects of rumination, self-efficacy and sense of control. The impact and prevalence of depression in the New Zealand population are well documented, however there are no known studies investigating levels of depression and career indecision alongside the challenges experienced through the transition from school to work or tertiary studies. A large-scale study conducted over several years that has indicated that levels of depression in New Zealand are high in youth, particularly in Māori and Pacific populations, who represent around 30% of the general population of New Zealand [12].

Depressive symptomatology or sub-threshold depression is the presence of depression symptoms resulting in specific symptomatology which then may result in impaired functioning, lowered functioning, lowered quality of life or mild depression, but do not meet the diagnostic criteria for a major depressive disorder in the DSM system [12–14]. These conditions can be defined by a specific threshold or cut-off score, on a valid self-rating depression scale [14]. Rates of depression, depressive symptomatology and distress have consistently been shown to increase during adolescence [15]. Given the potential harm that can arise during adolescence and persist into adulthood, there is a growing emphasis on prevention and the imperative of gaining a deeper understanding of significant risk factors that can trigger or worsen depressive symptoms. Early intervention can mitigate the rates of psychological distress and the subsequent development of depressive symptoms [16, 17]. The presence of depressive symptomatology is closely linked to the onset of full-blown depression, which can result in functional impairment and the increased risk of subsequent depressive episodes in adulthood [9, 18]. The early identification and treatment of depressive symptoms decreases the burden of later depression and suicide risk [18, 19].

There is a paucity of global research that examines depressive symptoms, negative thinking, or mental distress alongside career indecision, transitioning from high school alongside self-efficacy and sense of control [1, 20, 21]. Further, there is often a distinction drawn between career counselling and personal counselling, which is evident in the way in which research and counselling interventions have approached the topic, separating career-decision making from mental health concerns [1, 6, 22]. Depressive symptoms, including negative thinking, have also been linked with dropping out of high school whereby one out of four adolescents had significant depressive symptoms in the 3 months prior to leaving school [23]. It is equally notable that early drop out of school has also been closely linked to career indecision and low self-efficacy [23, 24]. Beck's cognitive model of depression identifies three cognitive patterns leading to depression, the way the individual views the self, the world, and the future in a negative way [1, 25]. This biased interpretation of events is likely to exert an adverse influence on emotional state and motivation, further negative thinking or cognitions can impact affect, motivation levels, and behaviours [1, 26, 27]. Negative thinking may thus also influence perceived sense of control over external barriers, as a student approaches the end of high school and may also feel pressured to make career decisions through the transition into work or study.

Rumination and negative thinking have been identified as two key risk factors for depression in youth [28, 29]. Rumination is defined as repetitive, often negative, thoughts and may occur in response to mood fluctuations, negative events, or lifestyle challenges [29, 30]. An individual may repetitively think about and analyse the causes, responses, and possible consequences of events or their mood states [29]. Researchers have found that rumination can precede depression and may worsen depressive symptomatology, drive negative thought processes, and impair problem-solving capability [28, 31, 32]. Difficulties with making choices as to what to do after school may give rise to irrational career thoughts or negative thinking patterns [33]. Rumination is included in the hypothesised model as a hypothesised moderator effect between career indecision and sense of control as well as self-efficacy. Rumination and ruminative responses have also been found to prolong depression and depressed mood [32, 34]. There are no known studies that investigate rumination, depression, and career indecision in school leavers as they transition out of school [20].

Walker and Peterson [35] conducted one of the first studies to investigate the relationships between negative career thinking, career indecision, and depression in college students. Walker and Peterson [35] found that dysfunctional career thoughts and career indecision were significantly related to depression, although they also concluded that this relationship is not fully understood, and causality has not yet been established. The researchers have suggested that there is a significant need to address mental health issues and career indecision using an integrated approach. This is in addition to the fact that the working environment is evolving rapidly, with new careers and significant change forces impacting on old or traditional careers [6, 36]. Research has also found that young people often make career choices on the basis of limited information, confined perceptions to their abilities as well as

perceived barriers in pursuing those career choices [37–39]. Students in New Zealand are expected to make subject choices 3 years prior to leaving school, and as they progress, they drop further subjects through to the last year of school. This may also affect opportunities for entering tertiary studies, or careers that are founded on certain subject requirements in school [3, 5, 8–11, 17].

Career-decision making is the process of seeking to resolve internal and external conflict whilst determining a career direction [8]. Vocational theories offer a basis on which counsellors and researchers can investigate and understand the process and concerns that individuals face when making career-related choices and decisions [6]. Blustein et al. [6] suggested that a key shortcoming in the theory to date is that there is a prevalent assumption that individuals can shape their careers and exercise their free will, uninhibited, in so far as choices are concerned. Blustein et al. [6] further suggested that this assumption has been indicative of a middle-class bias throughout the field and theories developed until now. There is also a dearth of research investigating this decision-making process alongside aspects of emotion and affect, and the impact that negative affect may have on the individual as a result of career indecision. There is often a degree of confusion that is associated with the decision-making process, which may be a result of negative thoughts, perceived locus or sense of control, self-efficacy, possible obstacles and knowledge or information of specific careers [35, 40]. The transition from high school is particularly challenging, with some international studies indicating links between leaving school, negative thinking, reduced sense of control, lowered self-efficacy and mental health challenges [35, 40].

General self-efficacy is a valuable area of focus in research and pertains to one's expectations around capability to perform and achieve in new situations and is a more "trait-like" belief in an individual's competence [41]. Self-efficacy may be described as a person's evaluation of his or her ability to perform a given skill or behaviour. Self-efficacy expectations are concerned not with an individual's actual skills but with their perceptions of their capabilities [4, 42]. Self-efficacy has been linked to career-decision making, perceived academic success, performance, problem solving capability, goal achievement, resilience, and achievement [22, 41, 43, 44]. Research has showed that strong career self-efficacy is closely linked to investigative and enquiring behaviours, whereby individuals seek alternatives and perceive them to be viable options [45, 46]. Shukla and Katapeth [46] emphasised the importance of thought processes that shape the career-decision making process, self-esteem, and self-efficacy. Self-efficacy has further been found to be significant in the process of making career decisions in relation to young people's ability and self-confidence in respect to identifying and pursuing career paths [4, 47]. Self-efficacy is included in the proposed model for testing as a hypothesised mediator effect between career indecision and depression.

Sense of control and perceived barriers or lowered chances of entering specific careers is shown through research to be closely linked with lowered self-efficacy and lowered career self-efficacy [48–50]. Sense of control has been linked to career indecision in so far as influencing expectations of adolescents around career choices, as well as contextual developmental pressures and future orientation [36, 51]. Factors such as a sense of control over personal or external constraints and self-efficacy, may impact the well-being and mental health of the young person. Sense of control is considered less as a characteristic and more as a perception in association with the context that the individual is in at a particular time [52]. Students in the final years of school have been found to have higher levels of stress and lowered sense of control over exams and future employment [5]. Sense of control or locus of control has also been found to influence negative thinking and motivation, and further linked to symptoms of depression in the pursuit of a career decision [53, 54]. Further research findings conducted across high school students in France reported uncertainty in relation to future employment and fear of failure [3]. Vignoli [3] suggested that a greater emphasis on personal counselling in the high school years may reduce anxiety and dysfunctional career emotions and thoughts. Sense of control is included in the proposed model for testing as a hypothesised mediator effect between career indecision and depression.

Transitioning from high school into tertiary studies or work is a key developmental step into adulthood, and there are increasing mental health issues arising in the transition [9]. Marcotte et al. [9] conducted a longitudinal study investigating depressive symptoms in relation to transitioning from school to college in a longitudinal study in Canada. Interventions during high school were shown to be effective in preventing future episodes of depression by supporting students during this transition period of considering potential occupations [9]. According to Blustein et al. [6], less than 20% of all vocational research is conducted on high school students. Further, adolescence offers a unique, critical window for intervention, which capitalises on ongoing neurodevelopmental processes to facilitate brain plasticity and lessens the impact of neural vulnerabilities to depressive symptomatology [15]. In schools, there is an opportunity for comprehensive interventions that enhance coping skills related to negative thinking and rumination, benefiting students' mental health.

This study specifically investigated the relationships between career-decision making, rumination, self-efficacy, sense of control and depressive symptomatology in high school students. Although there is some evidence suggesting that there is a relationship between career-decision making and mental health, most studies have been conducted in samples

in Europe and the USA, with no known studies being done in New Zealand [20]. As mentioned above, it is known that New Zealand has a concerning high prevalence of depression in high school students, but there is no research linking this to transitioning out of school and career-decision making, therefore it is important that more research is conducted in this population, with a view of highlighting possible mitigating factors and intervention opportunities [12].

This study aimed to fill the identified research gap concerning secondary school students as they approach transitioning out of school [20]. Specifically, the present study investigated career indecision, along with the connection with depression symptoms, rumination, and the impact of sense of control and self-efficacy. The proposed theoretical model uniquely integrates these important facets based on both the cognitive theories of depression as well as career-decision making, along with research findings elsewhere in the world that align sense of control and depression or decision-making. It is also based on those studies to date that show linkages between career indecision, self-efficacy and depression, albeit that these are generally from data collected in tertiary aged students [51–54].

The purpose of the present study was to investigate and test a proposed theoretical model, based on indicative gaps in the research to date in this population and purported relationships previously shown between some of the variables in older populations in other countries. The conceptual model was tested using moderation and mediation analysis, as well as generating a structural equation model (SEM), to investigate possible relationships between constructs, and to assess the interrelatedness and levels of career indecision, general self-efficacy, sense of control, rumination, and depressive symptomatology, in school students in the last 2 years of high school. The research is vital to further inform the direction for preventative strategies, to additionally support the identified need for integrated vocational and mental health counselling in schools, as well as suggesting ways to reduce drop-out rates in schools and tertiary institutions through raising awareness of the importance of addressing these constructs collectively and holistically [22, 55]. There is limited published research that has examined depressive symptomatology alongside sense of control, general self-efficacy, and career indecision [20]. Given the seriousness, pervasiveness, and growing presence of depressive symptomatology in young adults, this research aimed to investigate self-efficacy, negative thinking (rumination), sense of control and career indecision, specifically as youth are transitioning from school to tertiary studies, to investigate the possible associated development and incidence of rumination and depressive symptoms.

2 Method

2.1 Participants

Participants were 315 high school students in their final years, from multiple schools and youth organisations across New Zealand. The data were collected between November 2020 and October 2021, with the bulk of the data collected May 2021 to October 2021. All participants were at least 16 years of age. More than half of the participants (50.8%, $n = 160$) identified as female, 45.1% ($n = 142$) as male, around 2.9% ($n = 9$) as gender neutral, and 1% ($n = 3$) were under the category of “other”. Further, more than half of the participants (53.7%, $n = 169$) identified as New Zealand Europeans, 19.4% ($n = 61$) were Pacific peoples, around 13.7% ($n = 43$) were Māori, 5.1% ($n = 16$) were Asian, and approximately 7.3% ($n = 23$) identified as “other”. Of the 315 participants, 39.4% ($n = 124$) were aged between 17 and 18, while 31.7% were aged 18 years and above, and the remaining participants (28.9%) were 16 years old.

2.2 Procedure

Schools and youth organisations were approached and invited to participate in the research, mainly based on location. Attempts were made to approach schools representing the spectrum of socioeconomic range within the country. There were no incentives provided to schools or individuals to participate. The selection of schools and youth organisations was not randomised but were not personally known to the researchers. Convenience sampling of the organisations was used, followed by snowball sampling. Principals and leaders were required to agree to send the anonymous online Qualtrics questionnaire link to their students or youth in the required age group of between 16 and 20 years. Once participants were sent the survey link, the online survey included information and a consent form at the outset of the survey. The students were asked for their ethnicity, their gender, and their age. Students had to be at least 16 years old to participate in the research and had to be completing their final 2 years of school. Students were informed that they could withdraw from the study any time up until the point where they submitted their anonymous responses. Participants took on average 15 min to complete the surveys. Of the total of 430 participants who had received the questionnaire, 315 students

provided complete responses (response rate = 73%) on at least one of the five questionnaires. Data from these students were carried forward to statistical analyses.

2.3 Measures

Career indecision was assessed utilising the Career Decision Scale (CDS), a scale designed to measure career indecision and the antecedents to career indecision [56]. The scale comprises 18 items, and measures career certainty (2 items) and indecision (16 items). Items are on a 4-point scale, ranging from 1 = *Not at all like me* to 4 = *exactly like me*. Decision scores are the sum of scores on items 1 and 2. Indecision scores are calculated as the sum of the scores on items 3–18, with higher indecision indicated by higher scores. The CDS has good test–retest reliability and good construct validity [57]. It is widely used as a quantitative measure of indecision in adolescents and is a good estimate of career indecision [58, 59]. Cronbach's alpha and McDonald's omega for this study indecision scores were 0.87 and 0.85, respectively.

Depression or depressive symptoms were measured using the Center for Epidemiological Studies Depression scale (CES-D) [60]. The CES-D scale has been widely used globally to measure depressive symptoms across a wide range of age groups, has been cited over 61,000 times and is considered appropriate for adolescents [61–63]. The scale has 20 items and includes 4 items (Items 4, 8, 12, and 16) that are positively worded and need to be reverse coded prior to data analysis. Items are answered by scoring responses to the items as: 0 = *Rarely (Less than 1 day)*, 1 = *Some (1–2 days)*, 2 = *Occasionally (3–4 days)*, and 3 = *Most (5–7 days)*. In the CES-D scale, data were imputed providing no more than 4 items were missing. Scores were computed as the sum of the items and scores above 16 to 20 indicate mild to moderate symptoms of depression, whilst scores above 24 indicate severe depressive symptomatology [60, 64]. The CES-D scale has good internal consistency (Cronbach's $\alpha = 0.85$ in general population samples) and test–retest reliabilities (average $r = 0.57$ after 2–8 weeks) [60]. Cronbach's alpha and McDonald's omega for this study indecision scores were 0.90 and 0.91, respectively.

General self-efficacy was measured using the New General Self Efficacy Scale (GSES) [65]. This instrument is widely used and is considered a valid and reliable measure of general self-efficacy [41]. The scale measures the individual's perceptions of their abilities to perform and achieve capability goals across a variety of situations. The scale is reliable and has high content and predictive validity [41, 65]. There are eight items measured on a 5-point scale (ranging from 1 = *strongly disagree* to 5 = *strongly agree*), which are then averaged to a total score, a high score indicates high general self-efficacy. The internal consistency of the responses to these items range from 0.85 to 0.90 and the stability coefficients have ranged from $r = 0.62$ to $r = 0.65$ [65]. Cronbach's alpha and McDonald's omega for this study indecision scores were 0.90 and 0.91 respectively.

Rumination or negative thinking was assessed utilising the Ruminative Response Scale (RRS)-short form [66], a widely used measure of rumination, comprising 10 items that assess brooding and reflection [67, 68]. The RRS-short form is a 10-item scale that measures the individuals' propensity to ruminate. The scale comprises two subscales: brooding (five items) and reflection (five items). To each statement in the scale "what you generally do, not what you think you should do when you feel down, sad or depressed", respondents rate items on a 4-point scale (1 = *almost never* to 4 = *almost always*). The scale is widely used over English-speaking countries and is a reliable and valid measure of rumination [68–70]. The instrument has a high internal consistency and can be used in large scale screening. The RRS scores are separately analysed in respect of the two Sub-Scales—Brooding and Reflection. Each sub-scale comprised of 5 items with high scores indicating higher levels of brooding or reflection response styles. Over 200 papers referred to the distinction in the scale between the two factors, brooding and reflection, and analysed these factors separately [71]. Cronbach's alpha and McDonald's omega for this study rumination scores were 0.81 and 0.82 respectively.

Sense of control is measured with the Sense of Control (SOC) scale [52] and was utilised to assess the level of perceived control the participants have over their future and their lives. The scale measures two factors and comprises of two sub-scales which measure these factors, perceived constraints, and the degree of personal mastery. The scale has 12 items and uses a 7-point scale (1 = *strongly agree* to 7 = *strongly disagree*). The scale has been widely used and is a valid and reliable measure of sense of control [72, 73]. To score the scale, each item was reverse scored and then the average of all items was calculated. Cronbach's alpha and McDonald's omega for this study personal mastery scores were 0.81 and 0.81, respectively. Cronbach's alpha and McDonald's omega for this study perceived external barrier scores were 0.86 and 0.87, respectively.

2.4 Data analysis

The study aims to investigate and establish the possible relationships between the multiple constructs illustrated in the hypothesised model below. The researchers constructed the indicative model (Fig. 1), based on the relevant literature, theory and identified gaps in the research conducted to date [20]. The proposed conceptual path model comprises of five key constructs and possible relationships and effects. This model indicates the possible moderation effect of rumination or negative thinking between career indecision and self-efficacy and perceived sense of control over possible external barriers. The model also indicates the purported mediating effects of sense of control and self-efficacy between career indecision and depressive symptomatology. Based on hypothesised relationships between the variables and theories by Nolen-Hoeksema on rumination, Beck’s theories on cognition, depression and Bandura’s self-efficacy, the model aims to add to existing findings and combines constructs to explore the linkages and effects in a novel way [20].

The key research questions are:

1. As shown in the model (Fig. 1), does rumination moderate the effect of career indecision on the following constructs—perceived sense of control over external barriers, personal mastery, and general self-efficacy? In the postulated model, are these constructs also mediators between career indecision and depression?
2. After testing for moderation and mediation effects, using SEM testing, is the model a good fit to the data and does the model explain the possible relationships between the hypothesized constructs?

The model postulates relationships between the following constructs in the model, career indecision, sense of control, general self-efficacy, rumination, and depressive symptoms. The mediator effect of sense of control and self-efficacy is hypothesised in the postulated model to influence the relationship between career indecision and depressive symptomatology. It was postulated that both measured aspects of rumination on the RRS, brooding and reflection, possibly moderate between career indecision and sense of control and general self-efficacy. It is possible that the model could have been hypothesised to include rumination as an outcome in the same way as depression. However, previous research involving older students suggests that negative thinking may also be linked to career indecision. Future research may take other interactions into account.

A total of 430 students clicked on the link to the anonymous survey. Of those, 115 did not attempt to complete any of the scales and were excluded. A further 40 responses were excluded due to missing data exceeding 50%. In the remaining dataset, less than 1% of the data were missing. Little’s MCAR test indicated that there was no evidence against the null hypothesis that these data were completely missing at random. As a result, missing responses were imputed, using

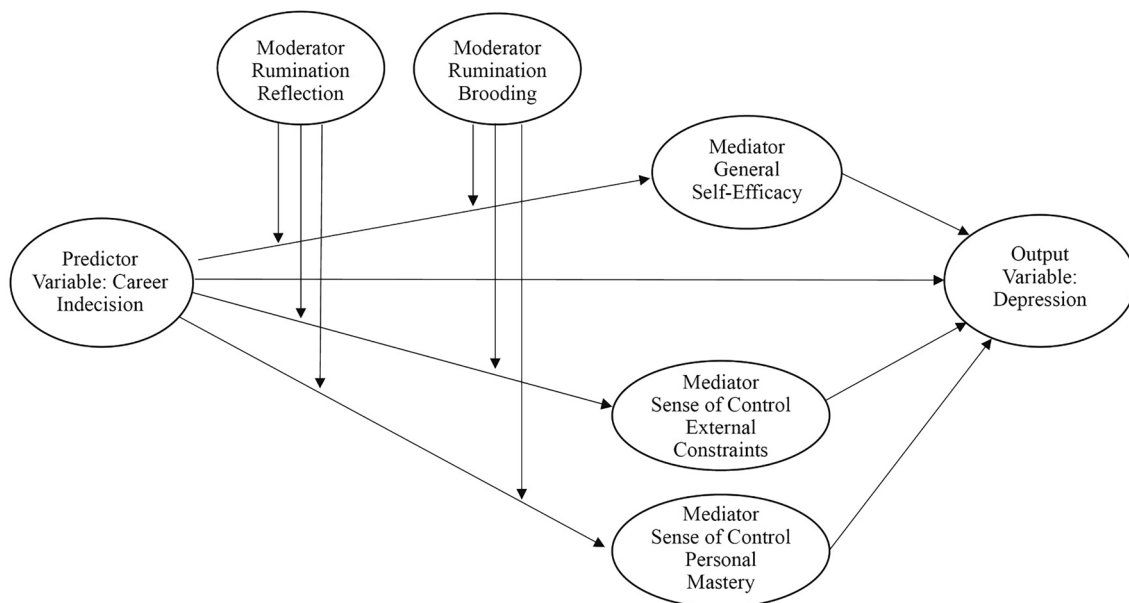


Fig. 1 Proposed theoretical model

sub-scale mean imputation. CES-D guidance recommended not imputing data if more than 4 answers were missing of the 16 on the scale, and this was applied. A final total of 275 fully completed responses across all 5 scales were used for data analysis. SPSS (Statistical Package for Social Sciences, version 28) was used for correlational analyses to assess the relationships between the constructs, career indecision, depression, rumination, sense of control and self-efficacy. Before conducting the SEM model analysis, data were tested for the possible moderation and mediation effects using relevant guidelines [74]. Hierarchical multiple regression assessed the extent of possible moderation effects of rumination (Brooding) and rumination (Reflection) as postulated in the model illustrated in Fig. 1. The results from the moderation testing then directly informed the final model testing. To test whether the assumptions for mediation analysis were met, mediation analysis on sense of control and self-efficacy data was separately conducted using PROCESS Hayes [75]. Data were centred prior to SEM in order to reduce multicollinearity and to improve model stability. The theoretical model was then tested using structural path analysis in AMOS (Analysis of Moment Structures, version 27). Model fit was evaluated with various fit indices, RMSEA (cutoff value close to 0.06), CFI (cutoff value close to 0.95) and SRMR (cutoff value close to 0.05) [76].

3 Results

Data from 275 respondents with all scales fully completed were used in the final analysis. The data were normally distributed and showed significantly high levels of career indecision, ruminative brooding, and depression, relative to normative reference scores on each scale. General self-efficacy levels were lower than in similar general population studies. Population mean scores have been measured at between 3.80 and 3.90, as compared with a lower mean score of 3.47 on the present study [65]. The descriptive statistics with normative reference scores are shown in Table 1.

The results from the correlational analysis show statistically significant relationships between the constructs. There was a statistically significant correlation between career indecision and depression scores, indicating that students with higher levels of career indecision tended to have greater levels of depressive symptoms. There was a significantly strong correlation between rumination and depression, and this was expected given previous studies [32]. Of particular interest are the relationships indicated between symptoms of depression, perceived sense of control over external constraints and career indecision. Lachman and Weaver [52] found a significant correlation between depression and perceived external constraints (0.48) mirrored by the results from the present study. The significance between self-efficacy and depression and career indecision mirrors previous studies, even though most prior research investigating these constructs involves tertiary education students [20]. Correlation data from the present study are tabulated in Table 2.

Assumptions for the mediation effect were tested before the SEM and in the regression analysis, sense of control (perceived external constraints) was found to significantly mediate the relationship between career indecision and depression ($\beta = 0.51$), while general self-efficacy partially mediated this connection ($\beta = -0.31$). The data showed that sense of control and general self-efficacy reduced the strength of the relationship between career indecision and depression. The β -value dropped for career indecision from 0.21 to -0.04 when sense of control (external barriers and constraints) was included and from 0.21 to 0.13 when general self-efficacy was included. This confirms the fourth criterion for mediation by Frazier et al. [74].

Moderation testing was then conducted to investigate the effect of rumination on sense of control and general self-efficacy based on the hypothesis that rumination, or negative thinking, may moderate the relationship between career indecision and these constructs. Firstly, product terms were created in SPSS for Career Indecision (CDS) and both aspects

Table 1 Descriptive statistics (sub-scales shown separately)

Scale	N	Mean	Norm ^a	SD	Min	Max
Career indecision (CDS)	275	37.47	30	9.15	16	64
Depression (CES-D)	275	25.16	16	11.47	1	53
General self-efficacy (GSES)	275	3.47	3.8	0.81	1	5
Sense of control personal mastery (SC-In)	275	5.56	–	1.02	1	7
Sense of control external constraints (SC-Ext)	275	4.21	–	1.21	1	7
Rumination—brooding (RRS-Br)	275	12.28	9	3.39	5	20
Rumination—reflection (RRS-Rf)	275	11.80	9	3.12	5	20

^aNormative scores are stipulated norms or cut-off scores for the scales [60, 64, 65, 68]

Table 2 Correlation analysis results (sub-scales shown separately)

Scale	1	2	3	4	5	6	7
1. Depression	–						
2. Career indecision	0.21*	–					
3. General self-efficacy	–0.35**	–0.26**	–				
4. External constraints	0.49**	0.49**	–0.37**	–			
5. Personal mastery	–0.28**	0.01	0.49**	–0.07	–		
6. Rumination—brooding	0.51**	–0.02	0.01	0.13*	–0.01	–	
7. Rumination—reflection	0.46**	–0.03	–0.02	0.13*	–0.06	0.61**	–

*Correlation is significant at the 0.05 level (two-tailed), n = 275

**Correlation is significant at the 0.01 level (two-tailed), n = 275

of rumination (reflection (RRF) and brooding (RRB)). This step was conducted to investigate the significance of the moderation effects before conducting SEM analysis on the model and non-significant moderation effects were not included in the model testing [74]. The results showed that only the indirect effect of career indecision through ruminative brooding (moderator variable) on sense of control, specifically perceived external constraints, was significant. Career indecision had a positive standardized coefficient ($\beta = 1.166$), ruminative brooding also showed a positive standardised coefficient ($\beta = 0.929$), both indicating that greater indecision and ruminative brooding was associated with heightened perception of perceived external constraints. The interaction term, brooding and career indecision, yielded a negative standardised coefficient ($\beta = -1.042$), indicating that the impact of career indecision on perceived external constraints is significantly moderated by brooding tendencies ($p < 0.001$). There were smaller effects measured of ruminative brooding on general self-efficacy and both these moderation effects were included in the final model testing. In contrast, the moderation effects of ruminative reflection were insignificant on perceived personal mastery, perceived external constraints and general self-efficacy.

3.1 SEM—goodness of fit and testing theoretical model

The researchers then conducted SEM analysis and the model analysed was adjusted to exclude any non-significant moderation or mediation relationships as determined by the initial testing described above. Means were centred before analysis and centred variables were used in the final testing. Centring assists with reducing multicollinearity were implemented to improve the stability of the model. Based on the results and fit indices, the adjusted Model A, as schematically depicted below in Fig. 2 was found to be an overall good fit.

Results from the goodness of fit testing in AMOS is shown in Table 3.

The GFI (Goodness of Fit Index) is 0.988, suggesting an overall good fit to the data, the AGFI (Adjusted Goodness of Fit Index) is 0.907. The SRMR (Standardised Root Mean Square Residual) value is 0.0453, indicating that the model is demonstrating a strong fit to the observed relationships in the data. The CFI (Comparative Fit Index) value is 0.970 and

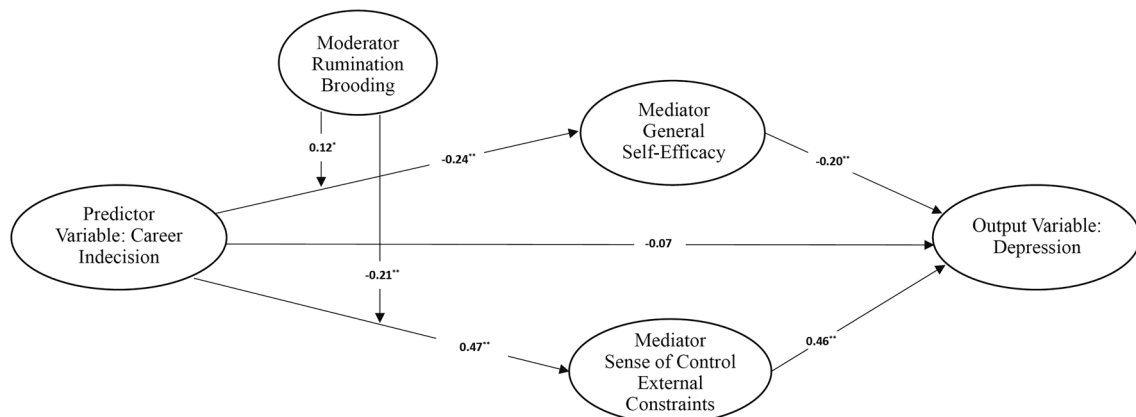


Fig. 2 Standardised regression weights and SEM analysis -adjusted Model A. **Significant at the 0.01 level. *Significant at the 0.05 level

Table 3 Goodness-of-fit results

Goodness of fit measure	Model value
Goodness of fit (GFI)	0.988
Adjusted goodness of fit (AGFI)	0.907
Standardised root mean square residual (SRMR)	0.045
Comparative fit index (CFI)	0.970
Root mean square error of approximation (RMSEA)	0.111

indicates a strong fit of the SEM to the data. Both GFI and CFI indices had values higher than 0.950, indicating an overall good model fit [54]. RMSEA (Root Mean Square Error of Approximation) was 0.111, with the lower confidence interval at 90% also at 0.043, the upper level of confidence interval is 0.190. RMSEA values may be more sensitive in smaller sample sizes such as in this study, so whilst RMSEA indicates that there may be some room for improvement in the model, when taken alongside the other fit indices and theoretical considerations, the data is an overall good fit. Regression weights are shown in the model (Fig. 2).

The adjusted Model A was found to be a good fit to the data, noting that the sample size can affect the SEM analysis given the complexity of the modelling.

4 Discussion

The final SEM has provided insights into the possible relationships between mental health constructs and career-decision making. Although the data are cross-sectional, which therefore precludes suggesting causality, the model results suggest that it is reasonable to hypothesise that sense of control over perceived external constraints plays a significant role in the relationship between career indecision, rumination, and depression. Further, ruminative brooding was found to moderate the relationship between career indecision and perceived external constraints. Levels of career indecision, depression and rumination in the study were elevated, underscoring the importance of understanding the complex relationships between mental health challenges that impact on career-decision making when students are transitioning out of school. The study's findings support previous research indicating a significant association between rumination and depression [32]. Further, the significant correlation between ruminative brooding and depression symptoms emphasises the relevance of negative thinking traits in contributing to psychological distress [8, 29]. The associations between career indecision, ruminative brooding, and perceived external constraints, highlight the importance of targeting negative thoughts and emotions through structured interventions aiming at alleviating depressive symptoms and problem-solving perceived barriers, as students struggle with career indecision.

The mediation analysis demonstrated that students' perceived sense of control over external constraints and general self-efficacy, played a significant role in mediating the relationships between career indecision and depression, in these school leavers. Together these mediating variables explained a significant proportion of the variance in depression scores. These findings suggested that individuals who are indecisive as to their career pathways may be more vulnerable to experiencing depressive symptoms when they perceive reduced control over external factors or have lower general self-efficacy beliefs. In the analysis, ruminative brooding emerged as a significant moderator, affecting the relationship between career indecision and perceived external constraints. Students who engaged in more brooding rumination were more likely to have higher perceived external barriers when grappling with career choices.

Moreover, in the present study the overall reported levels of depression were highly elevated. According to Radloff [60] only 21% of the general population scored at or above 16 in the validation testing for the scale. The CES-D scale has been validated and used across multiple studies involving adolescents, with reference levels and proposed cut-off scores still being used [61, 62, 64]. In the present study, 78.7% of the participants scored at or above 16. According to Radloff [60], these levels are significant and indicate the need to seek further assessment or intervention for depression. The levels observed in the Youth2000 study over the years 2001 to 2019 in New Zealand show increasing levels of depression symptoms, albeit a different measure was used. In contrast to the present study that used the CES-D, the Youth2000 study used the Reynolds Adolescent Depression Scale (RADS-SF) [12]. In New Zealand, there are indications that Pacific and Māori youth experience higher levels of depression. High levels of depressive symptomatology may impact school functioning and has also been associated with increased risk of overall functional impairment [16]. Depression can become more debilitating or inhibiting as time progresses or circumstances or lack of support continues [15]. Equally, the levels

of career indecision were significantly higher than the expected levels as measured in a similar aged population [77, 78]. Assessing symptoms of depression during career counselling and through the process of career-decision making has been suggested in previous research along with support for more holistic treatment [22, 55]. The research highlights further research is needed to assess interventions that address career indecision, negative thought patterns or rumination, and depression may indicate further support for more integrated counselling approaches in high schools. Walker and Peterson [35] have indicated that it is likely that the presence of symptoms of depression and negative thinking inhibits the ability for students to form decisions and to solve career-decision making problems. Further, research findings have suggested that depression and depressive symptomatology limit the ability for a young person to form good decisions and process their thinking around career choices [53, 79, 80]. Depression, depressive symptoms, rumination, and negative thinking may be both consequences and precursors to career indecision.

In this present study, the scale to measure rumination was selected as it was useful for assessing rumination at a specific time period (approaching the end of secondary schooling) [68]. Levels of rumination, particularly brooding, were high. Over 76% of the participants scored over the recommended scale cutoff score of 9 [68]. Measuring rumination is useful to predict symptoms of anxiety and depression over time [32, 68, 81]. The transition from high school into work or tertiary study has been linked to negative anticipatory emotions and career indecision [2] and therefore, the findings from the present study may give further insight for helping school leavers cope better and adapt through this transition. The results of the present study are explored in more detail below.

4.1 Key findings

The results from the present study indicated that undecided students who have heightened perceived external constraints as indicated on the sense of control scale, have higher levels of depressive symptomatology and the mediating effect of perceived external constraints was significant. Sense of control refers to the level at which students may feel they have control over barriers and is based on perceptions, rather than an innate trait characteristic. Therefore, this tool assessed sense of control at a specific time-point in a particular context, such as the transitional point of leaving school [51, 52, 72]. The results further show that general self-efficacy has a significant mediator effect between career indecision and depressive symptomatology. As a significant determinant of one's performance of a given behaviour, self-efficacy functions separately from the abilities that one possesses, although both skills and self-efficacy beliefs are necessary for competent functioning [4, 54].

The results show that ruminative brooding has a significant moderating effect on perceived external barriers. The results may imply that students who tend to engage in ruminative brooding through their career-decision making process may be more likely to perceive external constraints which may lead to a reduced sense of control over external factors. Increased brooding may result in a reduced sense of control. Students in the Youth2000 study have reported rising levels of anxiety and concern around access to food, cultural barriers, impacts of racism and income distribution [12]. There may be some uniquely perceived barriers in New Zealand given the degree of distance or remoteness of the country and its history of colonisation. Rumination may present before depression and the tendency to ruminate is also known to exacerbate symptoms of depression, it impairs problem solving and increases negative thinking [29]. The results from the present study support these findings and further relate these constructs to career-decision making. It is possible that given that brooding rumination involves repetitive negative thoughts, this may exacerbate the negative aspects around career related challenges and perceived barriers contributing to possible depressive symptomatology. Bandura has argued persuasively for the importance of self-efficacy in mental health and wellbeing, including reference to anxiety and depression [82]. Bandura's theory of self-efficacy also describes a model of depression whereby perceived self-efficacy is critical to an individual's sense of control over their future and impending academic achievement [43]. This sense of control and adaptation is an important defence against symptoms of depression. It may be that career confusion and indecision along with associated pressure through the process of career choice and perceived barriers, have a significant impact on distressed mood, negative affect, and depressive symptomatology.

The SEM analysis indicated an overall good fit to the revised model, whereby statistically significant paths were observed between career indecision, and general self-efficacy, as well as ruminative brooding, perceived sense of control over external barriers and depression symptoms. This suggests there is support for the proposition that when students who are undecided as to their career pathways as they are transitioning from school, who are also ruminative brooders, may have increased perceived external barriers. Further, if these students are undecided, perceived external barriers may significantly explain the relationship between career indecision and depression.

The SEM analysis suggested that the relationships between the constructs are significant in their interactivity between career indecision and depression. The internal dynamics of general self-efficacy representing an individual's belief in their capabilities to perform and overcome challenges, interacted with perceived external barriers in mediating the relationship between career indecision and depression. It is possible that as career indecision heightens, feelings of doubt and uncertainty, diminished self-efficacy and perceived external constraints, act as intermediary forces that amplify the impact of indecision on mental well-being, ultimately contributing to the possible development of depression. The SEM results suggest that the role of ruminative brooding moderates between career indecision and both self-efficacy and perceived external constraints. This implies that ruminative brooding intensifies the negative effect of career indecision on self-efficacy and heightens perceived external constraints. This may further increase the vulnerability of these students to developing depressive symptoms.

The results from the model analysis also suggest that rumination and sense of control over perceived external barriers may contribute to symptoms of depression within the workings of the overall model. Adolescents who engage in brooding rumination may have a heightened vulnerability to negative emotions and this may make them more susceptible to developing symptoms of depression [29, 34]. Further, school leavers who are indecisive as to their careers, who also ruminate, and who perceive they have lowered control over external barriers, may be more vulnerable to depression. A large study involving 17,348 university students from 23 countries indicated that students who reported low sense of control tended to also show depressive symptoms [72].

The collective findings from the SEM analysis may provide a deeper insight into the possible relationships between the constructs and the interplay between career indecision and depression. The results may also indicate the multifaceted interconnections between cognitive processes, the possible impact of lowered self-efficacy, the indicated role of perceived external barriers and trait factors such as rumination with overall emotional well-being. Developing a holistic understanding of these factors will be important in the development of targeted interventions.

The model that was developed in the present study highlights novel linkages between career-decision making and mental health. The evidence from testing the suitability of this model provides directions for how to integrating theoretical approaches in vocational and clinical counselling. Further research is needed to investigate these relationships more deeply. Due to the harm that depression and rumination can cause, both in adolescence and in later adulthood, there is an increased focus on prevention and therefore a need for a deeper understanding of identifying significant risk factors that may trigger the onset of depressive symptoms [16, 17]. Possible interventions that focus on enhancing self-efficacy as it impacts career-decision making, assisting in alleviating perceived external constraints through problem solving techniques and awareness along with developing stronger coping mechanisms via positive psychology approaches. It is further important to consider mitigating the potential amplification effects of rumination, and how they may disrupt the negative cycle which possibly leads to the development of depression in high school students as they transition from school. The results support previous calls for integrated approaches to mental health and vocational guidance, particularly given the importance of the transition point from school to study or work. Further research internationally and in New Zealand may yield further insights relating to diverse cultural landscapes.

4.2 Limitations of the present study

The possible limitations of the present study should be acknowledged. The sample may not fully represent the diverse population of school students transitioning from school across the entire country. To enhance the generalisability of the findings of the present study, similar research should be conducted in other countries. The good fit indices suggest that the model may be plausible and previous research and theory supports the considerations for the current study modelling. However, the present study relies on cross-sectional data, which limits establishing causality. This could be addressed through testing the reported model using a longitudinal study design. The study relies on self-reporting scales, which may introduce potential bias. Further validation and refinement of the SEM would be crucial in developing a targeted and more evidence-based effective counselling intervention programme for school leavers as they transition from school to work or tertiary studies.

5 Conclusion

The results of the present study show that there may be possible intricate and significant relationships between the constructs in the postulated model. The research aimed to advance the understanding of the complexity and the interplay between these key variables. The results indicate possible actionable response pathways and interventions for schools

and educational counsellors to work on, to foster a more supportive environment that holistically addresses both career indecision and mental health. A more integrated approach may focus on increasing self-efficacy, whilst recognizing the impact of perceived external constraints and working to assist in resolving these. Equally, future counselling practice should ensure that counsellors who provide career guidance are better equipped to identify and respond to ruminative patterns or negative thinking, as well as mental distress associated with career-decision making. Equipping students with mindfulness techniques to reduce stress and manage negative thinking patterns may also mitigate the inductive relationships between career indecision, rumination, and depression. It is hoped/envisioned that if these factors are addressed in an integrated manner, this will lead to more psychologically healthy and confident school-leavers. This would lay a healthy foundation from which adolescents/young people could embark on a journey beyond high school, enabling them to better navigate career-decision making with increased resilience and reduced emotional distress.

The present study findings support previous calls for a synthesis in provision of career counselling and integrated personal counselling, ensuring a greater awareness, as well as training, in mental health issues, at the high school level, as well as in entry level tertiary settings [6, 35]. Future research could involve a larger sample and longitudinal methodologies to further investigate the impact and possible causality of these factors, and to assess the interrelatedness of mental health and career processing in school leavers.

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Data availability The participants of this study did not give written consent for their data to be shared publicly, due to the sensitive nature of the research and age group, however anonymised data is available upon reasonable request from the corresponding author, F A Amaral.

Declarations

Ethics approval and consent to participate This study was approved by the Auckland University of Technology Ethics Committee (AUTEC)—Reference number 20/211 on 11 September 2020. The researchers certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. This study included human participants. All participants provided written informed consent online prior to participating. Written informed consent was obtained from a legally authorized representative/s (Participating Schools) for collecting anonymized student participation data analysed to be published in this article.

Competing interests The authors declare no competing interests.

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