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Cognitive Flexibility and Intolerance of Uncertainty amongst Undergraduate Dental and Medical Students during COVID-19 in a Healthcare University

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ABSTRACT

As the pandemic unfolded, the uncertainty about the continuity of learning became a source of stress for medical and dental undergraduates. Cognitive flexibility (CF) is one's capacity to adapt in response to environmental changes. CF correlated with intolerance of uncertainty (IU) which influences one's reaction to events. Previous literature has analyzed students' CF and IU. However, CF and IU during the COVID-19 pandemic needs to be explored especially for medical and dental students as these courses are practical skill based and when taught virtually can give rise to stress students and create self-doubt of their abilities. The Cognitive Flexibility Scale (CFS) and Intolerance of Uncertainty Scale (IUS) scales were administered to 74 medical and 89 dental students. An independent t-test revealed a significant difference in CF and IU between the medical and dental students. Dental students possessed lower CF and higher IU as opposed to medical students. A simple linear regression, IU was found to be inversely predicted by CF. The findings infer that medical students who have high CF are able to adjust to changes such as the sudden transformation to online learning settings during uncertain events like the COVID-19 pandemic as opposed to dental students. This study implies that the university needs to devise an intervention to assist dental students, particularly prepare them to face challenges and, to adapt to uncertainties in future.

Introduction

After being discovered for the first time on December 31st, 2019, in Wuhan City, China, the coronavirus has caused waves worldwide. On January 30, 2020, the World Health Organisation declared COVID-19 a global public health emergency (WHO, 2020). In Malaysia, the first case of COVID-19 was detected on 25 January 2020 and by 18 March 2020, a nationwide "Movement Control Order" was implemented to control the spread of COVID-19 (Shah et al., 2020). As the pandemic unfolded, the educational system was severely hit, with the shutting down of all universities and adoption of online learning, which impacted clinical training to an extent (Ramachandiran et al. 2023). Although the theoretical aspects of the program were largely restored through online lessons,

clinical training suffered. The unpredictable scenario, with uncertainties related to academic performance, course extension, future career prospects, social and financial constraints together posed as major stressors amongst university students (Sundarasen et al., 2020; Ramachandiran et al. 2023). A recent study showed several Norwegian dental students considered quitting their studies due to uncertainty and accumulated stress related to COVID-19 (Løset et al., 2022). Numerous studies have consistently found high levels of stress among dental and medical students (Montero-Marín et al., 2014; Brondani et al., 2014). There are several causes of stress amongst dental students for instance performing clinical dentistry, managing patients, meeting academic and clinical requirements, frequent assessments, anxiety over failing or falling behind, interactions with peers, clinical educators, and support staff, as well as a lack of time for self-care and relationships with loved ones (Burk &Bender, 2005; Naidu et al, 2002). Whereas, for medical students the expectations and strain of medical school may threaten their personal welfare in training, contributing to high levels of anxiety, depression, burnout, and psychological distress (Dyrbye et al. 2006). Mental health issues among students were shown to be strongly correlated with exam stress as a result of non-interaction interactions with faculty. A previous study has demonstrated a marked rise in perceived stress from first-year to third-year medical students, with an increased risk for depression (Ludwig et al., 2015). Eustress enhances performance, but distress or negative experiences of stress-related symptoms have adverse effects on mental health (Hakami et al., 2021).

Therefore, this study investigated the fundamental elements of intolerance to uncertainty which is one of the contributing factors to stress level and cognitive flexibility on how an individual can adapt to unforeseen situations.

One of the aims of this study is to compare dental and medical students because both medical and dental programes incorporated more simulation and virtual learning methodologies during the pandemic to make up for the deficit of clinical skill learning. Dental students rely heavily on hands-on skills to develop manual dexterity, while medical students rely on clinical rotations for patient interaction. Thus, restricted practical experience impacted the development of these skills which affected the confidence levels of the student (Ramachandiran et al., 2023. However, medical students could simulate a broader range of medical procedures and patient interactions as compared to to dental students who rely heavily on hands-on skills and clinical experience. Both medical and dental students also engage in research as part of their education. The pandemic had varying effects on research opportunities, with some projects being delayed or modified to accommodate remote work (Chaklader et al., 2022). Hence, a comparison is made between the undergraduate students of both these programmes.

Intolerance of Uncertainty (IU)

According to Buhr and Dugas (2009), the tendency to react negatively to uncertain situations and occurrences on an emotional, cognitive, and behavioural level is a personality trait that results from prior unfavourable ideas about uncertainty and its effects. Individuals who are unable to tolerate uncertainty are believed to possess a lack of coping skills to deal with threatening conditions which creates negative feelings. Individuals with high IU interpret unpredictable events as unsettling and frightening, leading to pessimistic expectations about the future (Demirtas & Yildiz, 2019). The health-related professions are full of uncertainty. It is of utmost importance for health professional students to have the ability to cope with different uncertainties that they would encounter in life. A study conducted in Turkey with 1772 participants showed an indirect relationship between high IU and low mental well-being (Satici et al., 2022). Previous literature shows that IU significantly predicted depression, anxiety, and insomnia (Zhuo et al., 2021). IU scale was associated with worry, anxiety, and depression (Buhr & Dugas, 2003; Freeston et al., 1994).

Cognitive Flexibility (CF)

According to Rhodes and Rozell (2017), cognitive flexibility is defined as the ability to assimilate previously learned information and concepts to generate novel solutions to new problems. It is referred to as one's ability to flexibly adjust one's behaviour to changing environmental demands (Armbruster et al., 2012). People with greater cognitive flexibility are adaptive and assertive, conscious of their choices in dealing with problems, sociable, sensitive, and tolerant of conflict and uncertainty. It improves one's capacity to deal with both physical and environmental stressors. Gabrys et al. (2018), have reported a strong association between cognitive flexibility scores and negative stress. When combined with optimistic thinking, high levels of CF have been linked to a significant reduction in emotional stress. Cambaz and Ünal recently studied the CF among students before and during the COVID-19 pandemic and concluded that CF of students decreased over time during the pandemic (Cambaz & Ünal, 2021).

Dual Process Theory on Intolerance of Uncertainty (IU) and Cognitive Flexibility (CF) among Medical and Dental Students

Dual process theory posits that the higher the intolerance of uncertainty the lower one's cognitive flexibility. Intolerance of uncertainty refers to an individual's discomfort or inability to deal with situations that are uncertain or ambiguous. Cognitive flexibility, on the other hand, is the ability to adapt and change one's thinking or behaviour in response to new or unexpected situations. When people are faced with a highly uncertain and rapidly changing situation like a pandemic, those who struggle with uncertainty may find it challenging to adapt to new information, make decisions, and change their behaviours as the situation evolves.

Dual process theory explains how humans have two cognitive processes, which are automatic or intuitive and controlled or deliberative. Cognitive flexibility is associated with controlled thinking, permitting individuals to adapt to uncertain situations. Whereas, intolerance of uncertainty is related to intuitive thinking, which tends to be less flexible and more reactive.

According to Evans & Stanovich, (2013), in dual-process theory, there are two general types of processes that function in the mind. The first process is called Type 1 that produces "intuitive" response autonomously and with less thinking involved. Whereas, the second is called Type 2 which requires more effortful thinking.

However, it's essential to note that these relationships can vary greatly from person to person. Some individuals may have high intolerance of uncertainty but still demonstrate high cognitive flexibility, while others with low intolerance of uncertainty may struggle with flexibility in their thinking and behavior, which is one of the objectives of this study.

The ability to tolerate ambiguity is linked to cognitive rigidity, which affects how people perceive, comprehend, and respond to circumstances. Previous literature suggests that CF is negatively correlated with IU. Lieberman et al demonstrated that adults with panic disorder had a negative correlation between CF and IU (Lieberman et al. 2016). Demirtas and Yildiz (2019) explored the relationship among hopelessness, CF, IU, and perceived stress among 302 university students in Turkey and suggested that CF was inversely correlated with IU and stress scale among non-health professional university students in Turkey. Results show that CF is a key characteristic that helps people build efficient coping methods for uncertain situations, however, it will reduce IU in stressful conditions. A mediation study suggested cognitive rigidity as a likely target for upcoming therapy among panic disorder patients with high IU. A group of adults with panic disorder showed a negative correlation between CF and IU (Lieberman et al., 2016). Several researchers have studied the IU and CF of students. However, COVID-19's psychosocial effects on undergraduate dental and medical students and their ability to protect their mental health have not yet been sufficiently explored. In terms of theorizing the relationship between these two variables, IU serves as a structure and CF serves as a function. The objectives of this study are to determine the significant differences in intolerance to uncertainty and cognitive flexibility between undergraduate dental and medical students and to determine the significant prediction of intolerance of uncertainty from cognitive flexibility among both the programmes during COVID-19 pandemic. The first null hypothesis was that there is no significant difference in intolerance to uncertainty and cognitive flexibility between undergraduate dental and medical students during the COVID-19 pandemic and the second null hypothesis was that there is no significant prediction of the intolerance of uncertainty from cognitive flexibility of dental and medical undergraduates during COVID-19 pandemic.

Methods and Materials

Study Design and Procedure

A cross-sectional survey design was conducted in this study. Stratified random sampling was employed and the population was divided into 2 strata (medical and dental students). The inclusion criteria encompassed actively enrolled dental and medical students in Years 1 through 5, while individuals who had been deferred, terminated, or suspended were excluded from the study. The population size of dental and medical undergraduates in the university was 300 and 700 respectively. The final sample N = 163, are the respondents who volunteered to participate in the survey which consisted of 89 dental and 74 medical students. In addition, using G-power sample size calculation, the overall predicted sample size is 148, with power of .95, margin of error .05 and with large effect size = .60 suffices the final sample collected.

A single mode of online data collection was employed through Google Forms which was sent to students through email and WhatsApp messages. Participation in th survey was voluntary. Online informed consent was obtained from all individual participants. Eighty nine

dental students and 74 medical students consented and completed the survey.

Sample Size

A total of 163 responses were collected out of which 89 dental students and 74 medical students participated in the survey. Almost 70% female respondents and 30% male students participated. The ethnicity of most respondents was Chinese (82.8%), followed by Indians (8.6%) and Malays (4.3%). The students ranged from Year 1 to 5, with the majority of 33.7% students in Year 3 and 22.1% in Year 4. The mean age was 21.79 years with a standard deviation of 1.623. 64.4 % of respondents were between the ages of 21 and 23.

Instruments

Three sets of questionnaires were distributed to students who consented to take part in the study. The survey involved self-administered questionnaires through an online platform which consisted of a sociodemographic profile, Intolerance of Uncertainty Scale (IUS), and Cognitive Flexibility Scale (CFS).

Intolerance of Uncertainty Scale (IUS)

IUS was first developed in French before being translated into English (Freeston et al., 1994). The English version of IUS was utilised by Buhr & Dugas in 2009.

This scale assesses a trait-like belief that uncertainty harms one's reputation, irritates them, stresses them out, and inhibits them from acting. There were a total of 27 items. The response format is a 5-point Likert scale ranging from 1 = "not at all characteristics of me" to 5 = "entirely characteristic of me." The scoring has two factors, i.e., uni-factorial and bi-factorial. Higher scores imply higher level of uncertainty of intolerance by simply adding up all items which results in uni-factorial. Regarding the bi-factorial dimension, Factor 1 is calculated by summing up Items 1, 2, 3, 9, 12, 13, 14, 15, 16, 17, 20, 22, 23, and 25, which measures uncertainty and has negative behavioral and self-referent implications. The responses for items 4, 5, 6,7, 8, 10, 11, 18, 19, 21, 26, and 27 were added to score for Factor 2 which measures uncertainty is unfair and spoils everything. IUS has shown good convergent and divergent validity, excellent internal consistency (α = 91.89) (Vadivel et al., 2022), and good

test–retest reliability indices over twelve weeks (Wilson, et al., 2020). (α = 0.78).

Cognitive Flexibility Scale (CFS)

Martin and Rubin developed CFS in 1995. The ability to be adaptive, flexible, and confident in one's ability to be flexible are all measured by this test. It has a total of 12 items. A 6-point Likert scale with the options of 6 = Strongly Agree, 5 = Agree, 4 = Slightly Agree, 3 = Slightly Disagree, 2 = Disagree, 1 = Strongly Disagree was provided. Items 2, 3, 5, and 10 are reversed scored. The test-retest reliability was measured using Pearson correlation tested 1 week apart (r =.83) (Martin and Rubin ,1995). The scale has high concurrent validity with the Interaction Involvement Scale.

Ethical approval

The university's Ethics Committee was sought for ethical approval, (BDS I-01/2021(10)).

Results

Data was analysed using an independent t-test and simple linear regression. Decision criteria were set at $p < 0.05$ to determine the hypothesis rejection threshold. Table 1 shows breakdown of demographic factors.

Table 1. Demographic of respondents (N = 163)

Category		Frequency	Percentage
Gender			
	Male	49	30.1
	Female	114	69.9
Ethnicity			
	Malay	7	4.3
	Chinese	135	82.8
	Indian	14	8.6
	Others	7	4.3
Program			
	Dental	89	54.6
	Medical	74	45.4
Year of Study			
	1	26	16.0
	2	26	16.0
	3	55	33.7
	4	36	22.1
	5	20	12.3
Age			
	18-20	35	21.5
	21-23	105	64.4
	24-26	21	12.9
	27-29	2	1.2

Source: Author

The Kolmogorov-Smirnov normality test was not violated for both the measured variables. Based on the score range, it can be construed that the degree of IU amongst both professions is generally low, as the scores range from 27 to 135. An independent t-test was employed to analyse the significant difference between the two programs in IU and CF variables respectively. The homogeneity of variance was evaluated using Levene's test of equality of variances. Assumptions were not violated for both variables, F (1.404), (161), p = .238); F(2.568), (161), p = 0.11. Results show that IU is significantly higher among dental students (M_{dental} = 78.70, SD_{dental} = 19.31) ;($M_{medical}$ = 69.77, $SD_{medical}$ = 21.720), t (161) = 2.777, p =.006 with a very large effect size of Cohen's d =20.435.

Results for CF among the two programs revealed that medical students' mean score was higher (M_{dental} = 50.52, SD_{dental} = 6.519); ($M_{medical}$ = 53.08, $SD_{medical}$ = 7.094), t(161) = -2.402, p =.017 Cohen's d = 6.786, inferring large effect size. CF scores range from 12 to 72, which infers both professions fared above average.

All assumptions for linear regression such ashomogeneity of variances and normality of residual were not violated. A linear regression analysis was used to determine whether CF would predict IU for both programmes during the COVID-19 pandemic, ANOVA, F (1, 161) = 17.385; p < .001 shows a significant value, indicating that the regression model is fit, thus, the predictor (CF) successfully predicted the dependent variable (IU); (β= -0.946, p <.001; t = 4.170, p < .001). A coefficient of determination of 9.7% variance in IU is explained by CF. For every 1 unit increase in CF, IU is decreased by -.946. The negative beta coefficient indicates that a higher degree of CF predicted a lower IU. Thus, demonstrating that students who are aware of alternatives, are flexible, adaptable, and are able to accept uncertain events readily.

Discussion

The first objective is to compare the IU and CF between undergraduate dental students and medical students during the COVID-19 pandemic. Dental students demonstrated a higher mean score in IU in comparison to medical students thus the first null hypothesis is rejected. In line with the results, dental students have lower CF levels as compared to medical students. This finding raises concern about dental undergraduates' performance on IU and CF. These findings are aligned with a study conducted in Kuwait which compared the stress levels of medical and dental undergraduates and concluded that dental students were more burdened because the dentistry curriculum covering more subjects during an academic year than the medical curriculum (Ahmad et al., 2017). Additional pressure stems from the technical skills dental students need to master in the dental simulation labs before they treat real patients. Medical education was found to be less stressful as compared to dental education by assessing chronic stress both before the start of an undergraduate course and after it has ended (Schmitter et al., 2008). According to a similar study conducted in Pakistan, dental students experienced higher stress than medical students in the clinical years of training (Abbasi et al., 2020). Another study conducted during the COVID-19 pandemic in Germany found that dental students have a heavier mental workload than medical students due to the significant practical content at the beginning of their studies (Guse et al., 2021). Intervention must be given in the form of integrated mechanisms of adapting to uncertain events and stress management techniques in the dental program to overcome the curricular challenges and produce future work-ready dental professionals by enhancing their psychological health to encounter unforeseen circumstances.

The second objective is to predict IU from CF. The findings from this study concluded that there is a significant prediction of IU from CF, thus the second null hypothesis is rejected. This is in line with a few findings from earlier investigations that suggested CF is inversely correlated with IU. For instance, according to Lieberman et al., adults with panic disorder have a negative correlation between their CF and their IU (Lieberman et al., 2016). Demirtas and Yildiz (2019) have explored the relationship between IU, perceived stress, hopelessness, and CF, among 302 university students in Turkey and reported that CF correlated negatively with IU and perceived stress.

Dental undergraduates who have low CF find it challenging to adapt to the changing environment and enduring unforeseen circumstances. Therefore, the ability to cope and adapt to the ever-changing environment must be enhanced. Constant training must be incorporated into the curriculum and assessment to enhance thinking capacity to encounter the challenges in future.

Limitations and Scope for Further Research

Despite the significant findings in this study, there are some limitations. IU and CF in students is measured at one point at one point in time only. The data was collected entirely through the online survey which could be prone to response bias. The size and diversity of our sample constrains the generalisability of our findings as almost

70% of the participants are female with 83% of Chinese ethnicity. These limit the generalization of findings to males and other ethnicities. We also have an insufficient sample size involving participants from a single private institution. Therefore, future research can be conducted with a larger sample size and a homogenous mix of students in terms of various programs to generalize at a bigger scale.

Conclusion

This study was conducted during COVID-19 pandemic, when there was an abrupt transition from traditional mode of teaching and learning to virtual education which impacted both medical and dental programs. The programmes are intended to be clinically oriented where patient-interaction is required. This phenomenon has brought about a postulation of the beliefs and feelings about the medical and dental students' behavior in regard to how much cognitive flexibility they possess and uncertainty tolerance during unforeseen circumstances, in this case the COVID-19 pandemic. The objective of this study is to determine the significant differences in CF and IU between undergraduate dental and medical students during the COVID-19 pandemic. The other objective is to determine whether CF is able to predict IU. Findings indicate that CF successfully predicted IU conforming with past studies, indicating an inverse negative correlation. There was also a significant difference in CF and IU between medical and dental students. Dental students scored low in cognitive flexibility and high in intolerance of uncertainty as opposed to medical students.

The findings will be of interest to educational institutions especially offering health professional education programmes which involves clinical practice and skills. The results emphasize the practical implication of enhancing cognitive flexibility by adjusting to overcome obstacles that may affect clinical learning.

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Competing interests

The authors have no competing interests to declare.

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Appendix: Supplementary Data

Part 1: Participant Demographic

Questionnaires

Age: |__|__| years

Gender:

☐ Male   ☐ Female

Ethnicity:

☐ Malay   ☐ Chinese   ☐ Indian   ☐ Other   *please specify:* _____

Nationality:

☐ Malaysian   ☐ Other   *please specify:* _____

Email address: _____

Are you an active undergraduate student in XXX university?

☐ Yes   ☐ No

Are you a medical or dental student?

☐ Medical   ☐ Dental

Which year are you in?

☐ Year 1   ☐ Year 2   ☐ Year 3   ☐ Year 4   ☐ Year 5

Part 2: Intolerance of Uncertainty Scale

Instruction: Please use the scale below to describe to what extent each item is characteristic of you. Please circle a number (1 to 5) that describes you best.

1. Uncertainty stops me from having a firm opinion.

2. Being uncertain means that a person is disorganised.

3. Uncertainty makes life intolerable.

4. It's unfair not having any guarantees in life.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

5. My mind can't be relaxed if I don't know what will happen tomorrow.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

6. Uncertainty makes me uneasy, anxious, or stressed.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

7. Unforeseen events upset me greatly.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me
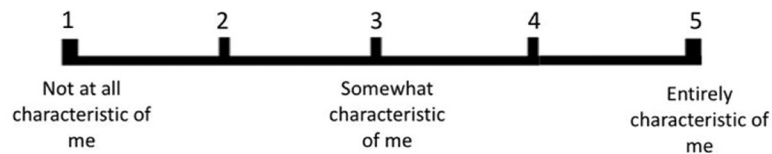
8. It frustrates me not having all the information I need.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

9. Uncertainty keeps me from living a full life.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

10. One should always look ahead so as to avoid surprises.

| 1 | 2 | 3 | 4 | 5 |

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

11. A small unforeseen event can spoil everything, even with the best of planning.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

12. When it's time to act, uncertainty paralyses me.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

13. Being uncertain means that I am not first rate.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

14. When I am uncertain, I can't go forward.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

15. When I am uncertain I can't function very well.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

16. Unlike me, others always seem to know where they are going with their lives.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

17. Uncertainty makes me vulnerable, unhappy, or sad.

1   2   3   4   5

Not at all characteristic of me   Somewhat characteristic of me   Entirely characteristic of me

18. I always want to know what the future has in store for me.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

19. I can't stand being taken by surprise.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

20. The smallest doubt can stop me from acting.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

21. I should be able to organise everything in advance.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

22. Being uncertain means that I lack confidence.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

23. I think it's unfair that other people seem sure about their future.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

24. Uncertainty keeps me from sleeping soundly.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

25. I must get away from all uncertain situations.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

26. The ambiguities in life stress me.

1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

27. I can't stand being undecided about my future.

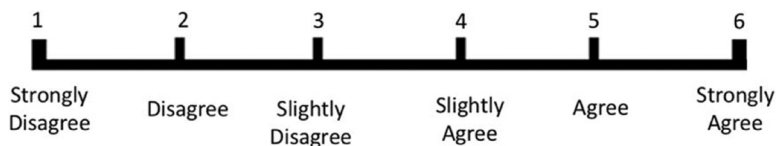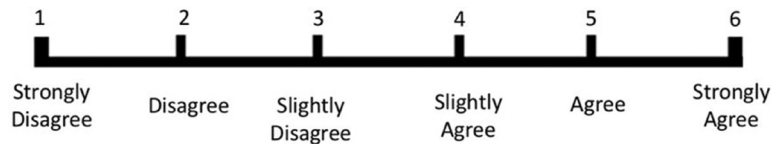| 1	2	3	4	5
Not at all characteristic of me		Somewhat characteristic of me		Entirely characteristic of me

Part 3: Cognitive Flexibility Scale

Instructions: The following statements deal with your beliefs and feelings about your own behaviour. Read each statement and respond by ticking the number that best represents your agreement with each statement.

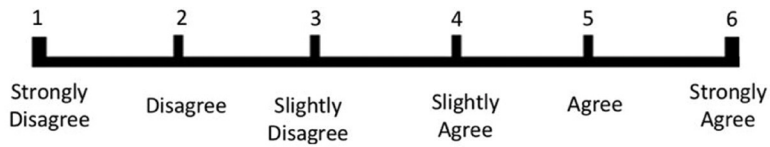1. I can communicate an idea in many different ways.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
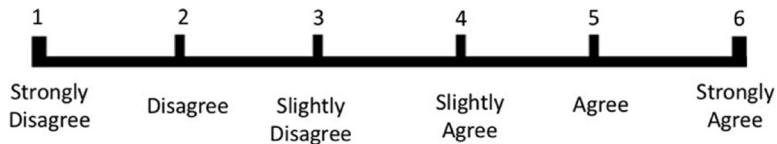
2. I avoid new and unusual situations.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

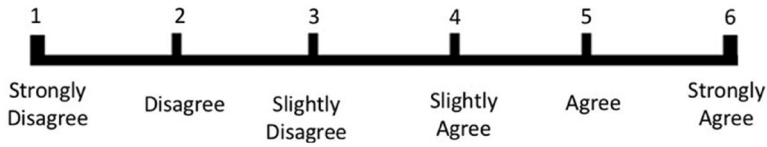| 1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

3. I feel like I never get to make decisions.

4. I can find workable solutions to seemingly unsolvable problems.

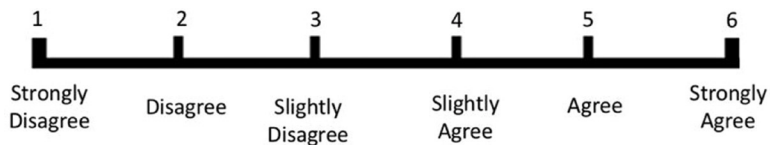| 1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

5. I seldom have choices when deciding how to behave.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

6. I am willing to work at creative solutions to problems.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
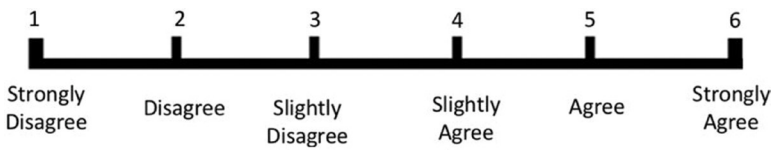
7. In any given situation, I am able to act appropriately.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

8. My behavior is a result of conscious decisions that I make.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
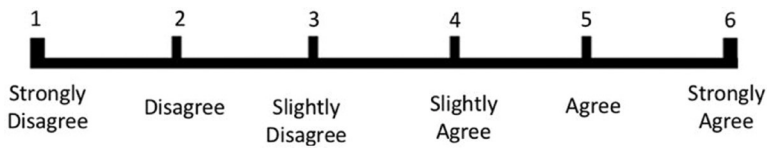
9. I have many possible ways of behaving in any given situation.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
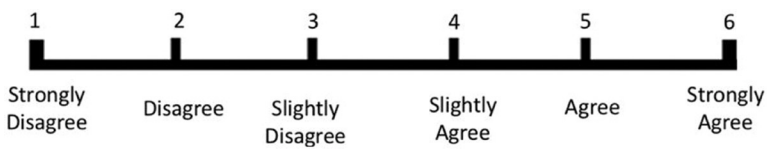
10. I have difficulty using my knowledge on a given topic in real life situations.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
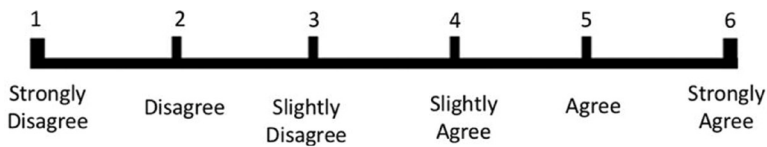
11. I am willing to listen and consider alternatives for handling a problem.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
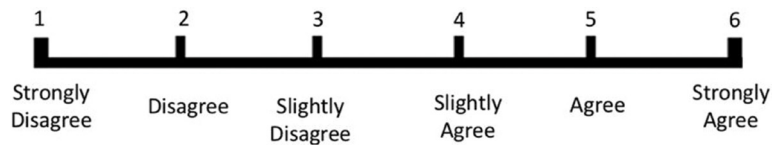
12. I have the self-confidence necessary to try different ways of behaving.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
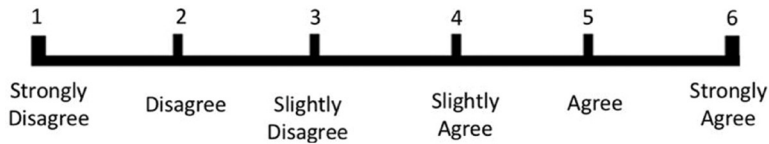
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She has won awards for teaching and innovation of learning resources to augment student learning. She has a keen interest in education-based research.

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