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RESEARCH ARTICLE



Emerging adulthood in medical school. Gender, school-related factors and Big Five traits related to medical students' quarter-life crisis

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ABSTRACT

Background: Quarter-life crisis is the anxiety and discomfort the young might experience at the end of their studies and at the beginning of their career. **Objectives:** Factors related to medical students' quarter-life crisis were explored in this study. **Methods:** in the cross-sectional study, 351 medical students (74.6% female, mean of age: 23.79 years, SD: 1.53 years) filled in the online questionnaire that contained Quarter-life Crisis Questionnaire, International Personality Item Pool version of Big Five markers, and questions about different aspects of medical school. Independent t-test, Mann-Whitney U test and linear regression analysis were performed. **Results:** Women reported higher quarter-life crisis ($t = -3.44, p = 0.001, \text{Cohen's } d = 0.42$). Higher quarter-life crisis displayed among those students who did not apply to medical university right after high school ($U = 2865.5, p = 0.03, \text{Cohen's } d = 0.24$). Students who would have not applied to medical school again ($t = -7.93, p < 0.001, \text{Cohen's } d = 0.90$); would have not encouraged their children to apply to medical school ($U = 10414.5, p < 0.001, \text{Cohen's } d = 0.57$); were uncertain to finish university ($t = 6.68, p < 0.001, \text{Cohen's } d = 0.74$) showed higher quarter-life crisis. Students who failed at least one term for academic reason ($U = 11809.5, p = 0.04, \text{Cohen's } d = 0.23$); did not feel to get proper knowledge to accomplish a medical job ($t = -3.90, p < 0.001, \text{Cohen's } d = 0.54$); were not satisfied with their grades ($U = 11560.5, p = 0.01, \text{Cohen's } d = 0.27$) reported higher quarter-life crisis. Students who did not plan to work in a clinical field and patient care ($t = -5.974, p = 0.00, \text{Cohen's } d = 0.93$); wanted to work abroad in the future ($U = 12931.5, p = 0.00; \text{Cohen's } d = 0.27$) had higher quarter-life crisis. Personality traits, such as extraversion ($\beta = -0.20, p < 0.001$), conscientiousness ($\beta = -0.10, p = 0.01$) were significant negative, neuroticism significant positive predictor of quarter-life crisis ($\beta = 0.61, p < 0.001$). **Conclusion:** The explored variables might be indicators of quarter-life crisis, and can be the basis of university counseling, when medical students' quarter-life crisis and emerging adulthood is in focus.

KEYWORDS

medical, medical student, quarter-life, crisis, emerging, adulthood

Kezdődő felnőttkor az orvosegyetemen. A nem, az egyetemhez kötődő tényezők és a Big Five vonások kapcsolata az orvostanhallgatók kapunyitási pánikjával

ABSZTRAKT

Elméleti háttér: A kapunyitási pánik az a szorongás és diszkomfortérzés, amelyet a fiatalok tanulmányaik végén és karrierjük kezdetén élhetnek át. **Cél:** Az orvostanhallgatók kapunyitási pánikjához kapcsolódó tényezőket vizsgáltuk. **Módszer:** A keresztmetszeti kutatásban 351 orvostanhallgató (74,6% nő, átlagéletkor: 23,79 év, szórás: 1,53 év) töltötte ki az online kérdőívet, amely a Kapunyitási Pánik Kérdőívet, az International Personality Item Pool version of Big Five markers nevű skálát, valamint az orvosi egyetem különböző aspektusaival kapcsolatos kérdéseket foglalta magában. **Eredmények:** A nők magasabb szintű kapunyitási pánikról számoltak be ($t = -3,44; p = 0,001; \text{Cohen-}d = 0,42$). A kapunyitási pánik magasabb szintű volt azok között a hallgatók között, akik nem azonnal jelentkeztek az orvosi egyetemre a középiskolát követően ($U = 2865,5; p = 0,03; \text{Cohen-}d = 0,24$). Azok a hallgatók, akik nem jelentkeznének újra orvosi egyetemre ($t = -7,93; p = 0,00; \text{Cohen-}d = 0,90$); nem

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ajánlanák gyermekeiknek, hogy jelentkezzenek orvosi egyetemre ($U = 10414,5$; $p = 0,00$; Cohen- $d = 0,57$); és akik bizonytalanok voltak abban, hogy befejezik-e az egyetemet ($t = 6,68$; $p < 0,001$; Cohen- $d = 0,74$), magasabb kapunyitási pánikot mutattak. Azok a hallgatók, akik legalább egy szemesztert csúsztak tanulmányi okok miatt ($U = 11809,5$; $p = 0,04$; Cohen- $d = 0,23$); akik nem gondolták úgy, hogy kellő tudást kaptak az orvosi munka ellátásához ($t = -3,90$; $p = 0,00$; Cohen $d = 0,54$); valamint akik nem voltak megelégedve jegyeikkel ($U = 11560,5$; $p = 0,01$; Cohen $d = 0,27$), magasabb szintű kapunyitási pánikról számoltak be. Azokat a hallgatókat, akik nem klinikai területen és betegellátásban ($t = -5,974$; $p = 0,00$; Cohen $d = 0,93$); illetve külföldön kívánnak dolgozni ($U = 12931,5$; $p < 0,001$; Cohen $d = 0,27$), magasabb szintű kapunyitási pánik jellemezte. A személyiségvonások közül az extraverzió ($\beta = -0,20$; $p < 0,001$), a lelkiismeretesség ($\beta = -0,10$; $p = 0,01$) szignifikáns negatív, a neuroticizmus szignifikánsan pozitív prediktora ($\beta = 0,61$; $p < 0,001$) volt a kapunyitási pániknak. *Konklúzió:* A vizsgált változók a kapunyitási pánik indikátorai lehetnek, és az egyetemen zajló pszichológiai tanácsadás alapjául szolgálhatnak, akkor, amikor az orvostanhallgatók kapunyitási pánikja és kezdődő felnőttkora van fókuszban.

KULCSSZAVAK

orvos, orvostanhallgató, kapunyitási, pánik, kezdődő felnőttkor

1. INTRODUCTION

1.1. Emerging adulthood and quarter-life crisis

Transition period between adolescence and young adulthood has been changing. Dominant developmental theorist, Erikson (1991) stated that people must face various crises at the stages of life course. He assumed that after solving the identity crisis in the adolescence, and finding answers for the ‘Who are you?’ and ‘Who do you want to be?’ questions, people could enter young adulthood where their major goal was settling down and establishing close, intimate relationship.

This assumption fit the industrialized societies in the middle of the 20th century, when the majority of people founded family and started to work in their early twenties but was no longer suitable to describe such societies from the end of the 20th century, characterized by rising age median of marriage, frequent job changes and pursuit of secondary education. Between adolescence and young adulthood, a new developmental stage is unfolding, the ‘emerging adulthood’. This term refers to the fact that becoming adult is now a longer period. People from the late adolescence up to their early twenties collect different experiences instead of immediately committing themselves to an adult role. Thus a new, separate period in the life course between the adolescence and young adulthood should be taken into consideration (Arnett, 2007).

The emergence of the new developmental period can be traced back to several economic, historical and social factors unfolded after World War II in the postmodern era (Atwood & Scholtz 2008).

1. Western, industrialized societies are ‘affluent societies’, that provide the young an easy access to goals of society (i.e. achieving status, prestige, material wealth), and means to achieve them. Thus, young people no longer experience gratification (as their parents did), once they reach these goals.

2. Traditional family structure has transformed. Now usually both parents are earners resulting in the faster accumulation of wealth. Parents also nod more easily to their children’s material needs. One consequence of this social trend is that children start to define themselves with material goods, which prolong their struggle to explore and find their real identity.
3. Rapid development of technology in the industrialized societies needs more specialization and expertise and this tendency extends schooling.
4. Individualism is a very dominant value in many Western societies, which is undermined by most aspects of adulthood, i.e. marriage, long-term career. This fact might work against young people’s commitment to found family or start a career.
5. Young adults are marginalized economic powers for several reasons (debts, unemployment, inadequate financial habit, etc.), that hinder financial independence from parents.

All in all, now identity exploration within the domain of work and worldviews do not finish with adolescence (Arnett, 2000). It continues in the emerging adulthood and blends with other challenges like establishing intimate relationships and founding family. Some of the youth (especially those who get an admission to a college) get a longer moratorium in the sense it was described by Marcia (1980) in his Identity Status paradigm. According to this model the four-identity status is determined by the presence or absence of the identity crisis and the commitment to an ideology and occupation. People in moratorium, one of the four identity stages, are experiencing identity crisis, trying to explore their own values and career paths. Thus they are in identity crisis, and still struggling to reach the real commitment. Taking into consideration the aforementioned societal changes, it seems that many Western societies legitimize a prolonged moratorium for some of the youth. They get a kind of timeout to commit themselves to a job, family and different ideologies. Consequently, moratorium seems to be no longer a special feature of adolescence, as it extends to



the young adulthood. Based on empirical evidences, [Marcia \(1980\)](#) also pointed out that moratoriums experience the most intensive level of anxiety out of the four identity statuses. This assumption is in line with the quarter-life crisis concept.

Quarter-life crisis is a possible consequence of emerging adulthood. It typically takes place and reaches its climax after the academic graduation and before the professional career. Young people in their twenties might feel panic, anxiety due to the countless possibilities, choices, and constant change after school years. The path the youth had seen and followed during their school years suddenly may become blurred, educational institutions no longer hold their hands ([Robbins & Wilner 2001](#)). The overwhelming options appearing in the period of emerging adulthood can be considered as affordances in [Gibson's \(1979\)](#) sense (cited by [Nelson, 2021](#)). Affordances are possibilities for actions provided by an object or environment. The major challenge in emerging adulthood is that affordances have long-term consequences leading to trajectories of flourishing or failures. Young people are exposed to various affordances that are in conflict with the image of adulthood, like carefree lifestyle, consuming drugs and alcohol, seeking for adventure. On the other hand, they are aware of the criteria of successful adult role, like taking responsibility, being less self-focused, prepared to establish a family ([Nelson, 2021](#)). Besides the numerous options and affordances, quarter-life crisis can be brought about by the so called 'forced adulthood' too, which means emerging adults are expected to fulfill adult role and responsibilities while they feel unready to meet these criteria ([Duara, Hugh-Jones, & Madill, 2021](#)). This is in line with the fact that the human brain is not totally developed in the early 20s, meaning that emerging adults might struggle with delaying gratification, risk perception, emotion regulation, etc. ([Nelson, 2021](#)).

1.2. Previous findings on quarter-life crisis

Surprisingly few empirical studies addressed quarter-life crisis. [Vida \(2011\)](#) examined the phenomenon with a special Quarter-life Crisis Questionnaire, and found that quarter-life crisis was higher for women, was not significantly different across ages, in some respect financial support associated with more favorable quarter-life crisis score, quarter-life crisis was the highest among those who lived alone or with their parents, and in some cases it was correlated with depression and anxiety. [Leist Balogh and Jámberi \(2016\)](#) found that women showed higher quarter-life crisis, it was associated with trait anxiety, did not differ across ages, and had a negative correlation with proactive coping respectively. [Robinson \(2019\)](#) followed a female subject's emerging adulthood over a 4-year period and identified 2 quarter-life crisis episodes within this interval. She showed a locked-out form of quarter-life crisis after failing to find a job multiple times. Locked-out type is a form of quarter-life crisis when the person experiences frustration and disappointment after an active but un-

successful engagement of a valued goal. The subject also experienced locked-in type of quarter-life crisis, when she tried to maintain her job despite her hostile boss. This type of quarter-life crisis occurs when people constantly commit themselves to a goal, even when their prior expectations cannot be fulfilled. [Robinson and Wright \(2013\)](#), investigating the prevalence and types of crisis episodes in a retrospective-autobiographic survey, found that in the examined quarter-life decade of adulthood (20–29) 'locked-in' life events were the most typical (i.e. 'Feeling trapped in a job you didn't want to be in'). In line with this [Yeler, Berber, Özdoğan and Çok \(2021\)](#) found that 82% of their respondents experienced crisis at some level, and the most remarkable ones were related to negative job experiences and financial issues.

[Henderson \(2019\)](#) reported that higher odds of poor mental health at the age of 25, labeled as quarter-life crisis, were predicted by unemployment, shift work, zero-hour contract as well as socioeconomic status and education attainment. Uncertainty, low status, poorly structured time might account for these associations.

[Agarwal, Guntuku, Robinson, Dunn and Ungar \(2020\)](#) examined social media users' terms and expressions with an artificial intelligence-based language analysis. Those who referred to quarter-life crisis also posted more about their desire to change, mixed emotions, career, illness, school and family, topics related to the emerging adulthood and quarter-life crisis concept. They also used more words reflecting to a future-focused state.

In contrast with these results, [Rossi and Merbert \(2011\)](#) found no evidence for the existence of quarter-life crisis *per se*. According to the original theory, recent graduate college students should have reported higher negative outcomes, like depression, anxiety. Instead, high school graduates displayed the highest anxiety scores.

1.3. The present study

University and especially medical school is a special social framework of emerging adulthood. It contributes to the young persons' identity formation and the transition from total family dependency to the autonomy of adulthood. Due to the demanding curriculum and increased responsibilities, medical university might boost some features of adulthood (like commitment, responsibility) earlier than other institutions of tertiary education ([Raikou & Konstantopoulou, 2021](#)). Nevertheless, we suppose that medical students are especially at risk of quarter-life crisis. Taking part in one of the longest and hardest academic challenge, they become independent (at least financially) from their parents later. Furthermore, the transition between the medical school and practice is drastic, since residents suddenly have to take huge responsibilities right after their studies.

To our best knowledge this is the first survey that addressed medical students' quarter-life crisis. Our goal was to determine which variables might be associated with medical students' quarter-life crisis. Although this is an ex-



ploratory study, we formed some hypotheses. Regarding the demographics, we hypothesized that quarter-life crisis would be higher among female students, based on previous studies that showed higher depression and anxiety among female medical students compared to male students (Mirza, Baig, Beyari, Halawani, & Mirza, 2021). We also supposed that quarter-life crisis positively correlates with age. Although the incidence of other negative affective outcomes like depression and anxiety vary across the academic years of medical schools (Mirza et al., 2021), we suppose that the closer the students get to the commitment to a medical specialization, the higher quarter-life crisis they might experience.

In the introduction we outlined that the abundance of affordances might bring about a prolonged moratorium of identity formation and in turn might lead to quarter-life crisis. Well-established commitment to a work and vocational goals are associated with youth's better wellbeing (Yeager, Bundick, & Johnson, 2012) and may also predict lower quarter-life crisis. Thus, we examined factors before the enrollment of medical school, that reflect commitment to the medical career. We hypothesized that quarter-life crisis was lower in the case of repeated entrance exams, and higher when students first did not apply for medical school; when students chose medical school for external factors (i.e. pressure from parents; family tradition) and not for internal factors (i.e. medical profession).

Based on previous studies, medical students' attitude about and satisfaction with medical school might be associated with their quarter-life crisis. Medical students' negative attitude about their profession and regret of career choice is associated with lower commitment and predicted higher odds of depression (Dahlin, Joneborg, & Runeson, 2005). In another study postgraduate medical students' thoughts of dropout were associated with profession choice regret (Peng et al., 2022). We investigated factors that reflected students' attitude about their studies, and we expected higher quarter-life crisis when students would have not chosen again medical university; would have not recommended medical studies for their children; and became unconfident to finish medical school respectively.

Academic workload (Hill, Goicochea, & Merlo, 2018; Seedhom, Kamel, Mohammed, & Raof, 2019) as well as performance pressure (Hill et al., 2018) are medical student's dominant stressors during the school years. Thus, we also involved some factors related to the students' studies and academic achievement. We hypothesized that quarter-life crisis was higher when a student had to repeat a term; had to passivate a term for no academic reason; was unsatisfied with his/her grades. Furthermore, clinical clerkships are an important part of the curriculum of medical schools, and an important basis of professional identity. It represents the transition between classroom activities to clinical workplace duties. Dimensions of preparedness for clinical clerkship, like confidence to carry out entrusted activities, preparation through university courses and coping with failures

are important predictors of perceived stress (Bosch, Maaz, Hitzblech, Holzhausen, & Peters, 2017). We supposed that experiences with clinical clerkships predict quarter-life crisis too, thus we supposed higher quarter-life crisis when the students felt that they did not acquire proper experience and knowledge to accomplish medical work.

We supposed that future orientation might also be the indicator of commitment to the profession and in turn predict quarter-life crisis. Planning to work in practice and doing typical clinical work might be such an indicator of commitment to medical profession. Anything else, even an academic career, might reflect lower commitment. Thus we expected higher quarter-life crisis when students did not want to work in a clinical field. Planning to work abroad can also be an important part of students' future perspective. Moving to a foreign country raises further challenges like adapting to another society, culture and working collective and split up from family, friends. It might also reflect a dissatisfaction and negative attitude about the opportunities and conditions the students think their own country can provide. Based on these assumptions we expected higher quarter-life crisis when student planned a career abroad.

Previous studies showed that Big Five personality traits might be important contributors of medical students' mental health outcomes such as stress (Bergmann, Muth, & Loerbroks, 2019), anxiety, depression (Milić, Škrlec, Vranješ, Podgornjak, & Heffer, 2019) and burnout (Wang, Li, Chen, Yan, & Wen, 2022). Based on these findings we also implemented "Big Five" traits into our study, supposing that extraversion, intellect/imagination, agreeableness, conscientiousness were negative, neuroticism was a positive predictor of quarter life crisis.

2. METHODS

Ethics permission for this research was obtained from the Ethics Committee, Albert Szent-Györgyi Health Centre, University of Szeged (permission number: 195/2019-SZTE).

2.1. Sample and procedure

356 respondents filled in the questionnaire, 5 cases had to be excluded since they were not medical students. 74.6% of the finally included 351 respondents was female, mean age was 23.79 (SD = 1.53) years. 1.1% of the respondents were fulfilling their first, 1.7% their second, 3.4% their third, 13.1% their fourth, 48.7% their fifth, 31.9% their sixth academic year.

Data collection took place during the fall of academic year 2019/20. The online questionnaire was made by Google Forms (Google LLC, Mountain View, CA, US.). The link of the questionnaire was shared in Hungarian medical students' groups on different social media to gather a conveni-



ence sample. 39.8% of the respondents studied at the University of Szeged, 38.1% at Semmelweis University, 21.2% at the University of Debrecen, 0.6% at the University of Pécs, and 0.3% at the University of Medicine and Pharmacy of Târgu Mureş. Respondents made an informed consent confirming to have understood that the questionnaire was anonymous, did not contain any data that could unfold the participant's identity, participation was voluntary, and could be canceled any time without any justification.

2.2. Measures

Quarter-life crisis was measured with *Quarter-Life Crisis Questionnaire* (QLC; [Vida, 2011](#)), a translated (Hungarian), modified, extended and validated version of the original scale ([Hassler, 2009](#)). The scale consists of 46 items and measures the total level of quarter-life crisis, and its factors: career-crisis; positive expectations; anxiety and low self-confidence; worries about making decisions; perceptions about the future; decision-related concerns; perceptions about passage of time; concerns about relationship; conformity to others; thoughts about financial aspects of life; dependency/independency. Respondents give their answer on a 5-point Likert scale where 1: totally disagree; 5: totally agree. I.e. 'I feel, that there are too many opportunities and I simply cannot opt from them.' 'I am ashamed and confused, because I have not figured out what to do with my life.' On our sample Cronbach's $\alpha = 0.94$.

Personality traits were measured with the Hungarian version of 50-item *International Personality Item Pool* (IPIP) version of Big Five markers ([Goldberg, 1999](#); [Goldberg et al., 2006](#); [Kun & Mártonfalvi, 2003](#)), where 10–10 IPIP items were assigned for each of the Big Five dimensions: (1) extraversion (i.e. 'Feel comfortable around people'); (2) intellect/imagination, classically also described as openness (i.e. 'Am full of ideas.');

(3) emotional stability (i.e. 'Get stressed out easily.');

(4) agreeableness (i.e. 'Sympathize with others' feelings.');

(5) conscientiousness (i.e. 'Like order.'). Items could be answered on a 5-point Likert scale with 1: very inaccurate; 5: very accurate. On our sample Cronbach's α was 0.85 for extraversion; 0.76 for openness; 0.89 for emotional stability; 0.86 for agreeableness; and 0.83 for conscientiousness respectively.

Aiming our hypotheses, the questionnaire included *gender, age, academic year*, as well as *questions about different aspects of medical school* were also asked:

1. Pre-medical school aspects
 - a) Did you apply to medical school right after high school?
 - b) Were you successfully admitted to the medical school for the first time?
 - c) Which one accounts better for your choice of medical school?

2. Attitude about medical school
 - a) Would you apply to medical school again?
 - b) Would you recommend for your child to apply to medical school?
 - c) Have you ever had a moment during your studies when you were uncertain to finish the medical school?
3. Academic achievement
 - a) Did you repeat at least a term for academic reason?
 - b) Did you passivate at least a term for no academic reason?
 - c) Do you feel to acquire enough knowledge and skill for your future job?
 - d) Are you satisfied with your grades?
4. Future plans
 - a) Do you want to work in a clinical field?
 - b) Do you want to work abroad after finishing the medical school?

All of these could be answered by a simple yes/no answer except 'Which one accounts better for your choice of medical school?' Regarding this, participants could choose between 'Internal/own/individual factors, motives' or 'External factors/other persons' influence'.

2.3. Statistics

Statistical analyses were performed with IBM SPSS Statistics v. 25 for Windows. Total QLC score was considered as dependent variable in each of the statistical analyses. In the case of categorical independent variables independent samples *t*-test was applied. When assumptions of normal distribution or homogeneity of variances were rejected, Mann–Whitney *U*-test was used. Effect sizes were estimated with Cohen's *d* using Psychometrica online calculator ([Lenhard & Lenhard, 2016](#)). A *d* value of 0.2, 0.5, 0.8 represented small, medium, large effect sizes, respectively ([Fritz, Morris, & Richler, 2012](#)). The relationship of QLC and continuous independent variables (age, Big Five personality traits) were examined with Pearson's correlation and hierarchical linear regression analysis. In the regression analysis age and gender were controlled.

3. RESULTS

3.1. Factors prior to medical school and quarter-life crisis

We found that those who had not applied to medical university right after finishing high school, reported significantly higher quarter-life crisis than those who had immediately applied to medical school (*Table 1*). The effect size was small.



Table 1. Relationship between pre-medical school factors and quarter-life crisis

Factors prior to medical school	Yes	No	Statistical value	Effect size
Successful entrance exam first time?	132.02 (31.55) ^a n = 294	134.04 (34.34) ^a n = 57	t = -0.43	Cohen's d = 0.06
Applied for medical school right after high school?	172.76 ^b n = 327	220.10 ^b n = 24	U = 2865.5*	Cohen's d = 0.24
Chose medical school for external factors?	219.41 ^b n = 17	173.79 ^b n = 334	U = 2101	Cohen's d = 0.19
Gender Difference	Male	Female		
	122.44 (31.40) ^a n = 89	135.72 (31.53) ^a n = 262	t = -3.44***	Cohen's d = 0.42

Notes: * $p < 0.05$, *** $p < 0.001$, ^a mean and standard deviation (in bracket) of quarter-life crisis score, ^b mean rank of quarter life crisis score.

3.2. Attitudes towards medical school and quarter-life crisis

Those who would have not applied again to medical university showed significantly higher quarter-life crisis than those who would have chosen this career again. We note that the effect size is rather high (Cohen's $d = 0.90$). Those

who would have not recommended medical university for their children displayed significantly higher quarter-life crisis, compared to those who would have encouraged their children to apply to it. The effect size was medium. Students who were not confident to finish medical school experienced significantly higher quarter-life crises than those who were sure to graduate from medical studies. The effect size was medium. *Table 2* displays these results.

Table 2. Relationship between factors reflecting attitudes towards medical school and quarter-life crisis

Attitude about medical school	Yes	No	Statistical value	Effect size
Apply to medical university again?	123.47 (29.50) ^a n = 223	149.89 (29.43) ^a n = 118	t = -7.93***	Cohen's d = 0.90
Recommend medical school for their children?	145.79 ^b n = 162	201.90 ^b n = 189	U = 10414.5***	Cohen's d = 0.57
Unconfident to finish university?	138.23 (31.74) ^a n = 260	115.57 (26.34) ^a n = 91	t = 6.68***	Cohen's d = 0.74

Notes: *** $p < 0.001$, ^a mean and standard deviation (in bracket) of quarter life-crisis score, ^b mean rank of quarter-life crisis score.

3.3. Factors of academic achievement and quarter-life crisis

Students who had repeated at least a term for academic reason, reported significantly higher quarter-life crisis than those who had not. The effect size was small. Those also

displayed significantly higher quarter-life crises who did not agree that they were acquiring proper knowledge to get on well with medical work in the future, compared to those who felt that they were. Finally, students who were not satisfied with their grades had significantly higher quarter-life crises than those who were content with them. The effect size was small. See *Table 3* for these results.

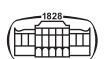


Table 3. Relationship between factors related to academic achievement and quarter-life crisis

Factors related to academic achievement	Yes	No	Statistical value	Effect size
Repeated term for academic reason?	191.69 ^b <i>n</i> = 116	168.25 ^b <i>n</i> = 235	$U = 11809.5^*$	Cohen's $d = 0.23$
Passivated term for no academic reason	142.11 (32.81) ^a <i>n</i> = 38	131.17 (31.73) ^a <i>n</i> = 313	$t = 1.20$	Cohen's $d = -0.34$
Acquiring enough knowledge?	118.66 (31.84) ^a <i>n</i> = 64	135.55 (31.22) ^a <i>n</i> = 286	$t = -3.90^{***}$	Cohen's $d = 0.54$
Satisfied with grades?	166.33 ^b <i>n</i> = 232	194.85 ^b <i>n</i> = 119	$U = 11560.5^*$	Cohen's $d = 0.27$

Notes: * $p < 0.05$, *** $p < 0.001$, ^a mean and standard deviation (in bracket) of quarter life-crisis score, ^b mean rank of quarter-life crisis score.

3.4. Future plans and quarter-life crisis

Those students reported significantly higher quarter-life crises who did not plan to work in a clinical field or patient care, compared to those who did and the effect size was high here (Cohen's $d = 0.93$). Furthermore, students who wanted to work abroad showed significantly higher quarter-life crises than those who imagined their future career in their home country. The effect size was small (Table 4).

3.5. Gender, age and quarter-life crisis

Women had significantly higher quarter-life crisis than men (see Table 1). We did not find significant correlation between age and quarter life crisis (Table 5).

Table 4. Relationship between factors of medical students' future plans and quarter-life crisis

Future plan	Yes	No	Statistical value	Effect size
Want to work in a clinical field?	129.33 (31.18) ^a <i>n</i> = 314	157.97 (27.13) ^a <i>n</i> = 37	$t = -5.974^{**}$	Cohen's $d = 0.93$
Want to work abroad?	188.15 ^b <i>n</i> = 93	161.33 ^b <i>n</i> = 258	$U = 12931.5^*$	Cohen's $d = 0.27$

Notes: * $p < 0.05$, ** $p < 0.01$, ^a mean and standard deviation (in bracket) of quarter-life crisis score, ^b mean rank of quarter-life crisis score.

Table 5. Pearson correlation-coefficients between quarter life-crisis score and continuous variables

Variables	1.	2.	3.	4.	5.	6.
1. Quarter-life crisis	1					
2. Age	0.09	1				
3. Extraversion	-0.30 ^{**}	0.01	1			
4. Agreeableness	-0.05	0.04	0.24 ^{**}	1		
5. Conscientiousness	-0.21 ^{**}	-0.06	-0.001	0.08	1	
6. Neuroticism	0.65 ^{**}	0.08	-0.17 ^{**}	-0.07	-0.18 ^{**}	1
7. Intellect/Imagination	-0.15 ^{**}	-0.02	0.29 ^{**}	0.24 ^{**}	0.07	-0.09

Notes: ** $p < 0.01$.



3.6. Relationship between Big Five Personality Traits and quarter-life crisis

Quarter-life crisis had a significant positive strong correlation with neuroticism, a significant negative moderate correlation with extraversion; and had significant negative weak correlations with conscientiousness and intellect/imagination (Table 5).

The linear regression analysis of quarter-life crisis (Table 6) revealed that the model ($F(2, 348) = 7.24$, $p = 0,001$) that included only the control variables (gender and age) accounted for just 3.4% of the variance. When the personality traits as predictors were added to the model ($F(7, 343) = 44.78$, $p < 0,001$), it explained 46.7% of the variance. Significant negative predictors of quarter-life crisis were extraversion, conscientiousness. Significant positive predictor was neuroticism.

Table 6. Hierarchical linear regression analysis of quarter-life crisis score

Model		β	t	VIF
Model 1	Constant		3.06**	
	Gender (female=1)	0.18	3.39**	1.001
	Age	0.09	1.61	1.001
Model 2	Constant		3.502**	
	Gender (female=1)	-0.02	-0.57	1.181
	Age	0.04	0.958	1.011
	Extraversion	-0.20	-4,76***	1.191
	Agreeableness	0.07	1.66	1.227
	Conscientiousness	-0.10	-2.60*	1.057
	Neuroticism	0.61	14.52***	1.171
	Intellect/imagination	-0.05	-1.09	1.217

Note: * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$, VIF: variance inflation factors.

4. DISCUSSION

To the best of our knowledge, this is the first study that explored medical school-related factors that were associated with medical students' quarter-life crisis. Study years in the medical school coincide with the emerging adulthood, a new development stage that refers to the prolonging transition from adolescence to adulthood (Arnett, 2000). Emerging adulthood is characterized by an overwhelming number of affordances and options (Nelson, 2021), which might lead to quarter-life crisis, a special anxiety young people in their twenties might experience (Robbins & Wilner, 2001). This is a dragging moratorium (in the sense of Marcia (1980)), where Western societies authorize young

people to reach their commitment to a career later. Based on these assumptions, we supposed that variables reflect higher commitment to medical profession and medical studies were associated with lower quarter-life crisis.

Accordingly, those who supposedly had been more committed to the medical career, and applied to medical school right after high school, reported lower quarter-life crisis. Furthermore, variables reflecting negative attitudes towards medical school and studies were associated with higher quarter-life crisis. Those who would have not recommended medical school for their children, were no longer confident to finish their studies, or would not have applied again to a medical school, displayed higher quarter-life crisis. In line with this, a previous study showed that medical students' regret about their career choice was associated with lower commitment and higher chance of depressive symptoms (Dahlin et al., 2005). Our results are also consistent with previous studies that showed a negative correlation between student's academic satisfaction and other negative psychological variables, like anxiety, depression and perceived stress (Bayram & Bilgel, 2008; Silva & Figueiredo-Braga, 2018), and a relationship between medical students' thoughts of dropping out and dimensions of burnout (Dyrbye et al., 2010).

Examined factors of the academic achievement also associated with quarter-life crisis. Students who got stuck and repeated at least one term for academic reason were unsatisfied with their grades, or were not content with the knowledge provided by the university, all showed higher quarter-life crisis. These results are in line with other studies where academic flounders associated with other negative psychological outcomes. For example, satisfaction with academic achievement was one of the predictors of both medical students' anxiety and depression (Pokhrel, Khadayat, & Tulachan, 2020), and the number of received course credits had a negative correlation with depression (Iorga, Dondas, & Zugun-Eloae, 2018). Academic failures might associate with weakened commitment to the profession and in turn with higher quarter-life crisis.

Some aspects of medical students' future plans were also associated with the (lower) level of quarter-life crisis, such as the intention to work as a clinician or in patient care, or work in their country instead of abroad. We form a careful assumption here, namely that greater commitment to practical medical work might stem from higher confidence in medical studies, stronger sense of professional identity and in turn causes less confusion and anxiety about the future. Regarding the second finding, working abroad usually brings about more uncertainty, which might also increase quarter-life crisis. Our study design does not make it possible to confirm the direction of the relationship between these variables and quarter-life crisis. Quarter-life crisis itself can also affect medical student's future plan. Later longitudinal studies might shed light on the direction of these relationships.

Overall, those variables that might reflect lower commitment to the medical career path, and negative attitude about medical school are associated with higher quarter-life



crisis. The concept of commitment anxiety can give an insight into the background of this relationship. Commitment anxiety is a dysfunctional cognitive functioning, one's inability to commit to a specific career accompanied by generalized anxiety. It is positively correlated with career tension, an emotional pressure comes to surface, when one is urged to make a career decision. According to the classic cognitive information processing theory factors like commitment anxiety and career tension can make the problem-solving process of career decision making more difficult (Finklea & Osborn, 2019).

Gender also had a significant relationship with quarter-life crisis: female students displayed higher quarter-life crises than male students, which is in line with previous findings (Leist Balogh & Jámbori, 2016; Vida, 2011), and also fits some results from emerging adulthood studies. Later findings showed that for women this prolonged transition period might be more challenging and more unstructured. This might be partly due to the fact that women usually had to face more role conflicts and maintain a very sensitive balance between work and family (Crocetti, et al., 2015). Female doctors have to cope with similar job-family role conflicts (Gjerberg, 2003; Molnár & Györffy, 2012), and we presume that women plan the reconciliation of work and family even during their study years in medical schools. For example, in a study female last-year medical students were motivated to effectively combine family life with work. This motivational factor correlated with finding ideal work time, mainly part-time job only among female students. The result shows that mainly female students compromise career and working hour for the sake of family (Diderichsen, Johansson, Verdonk, Lagro-Janssen, & Hamberg, 2013).

Some of our findings contribute to the growing body of results about the role of Big Five traits in medical student's well-being. For example, emotional stability, agreeableness and openness negatively correlated with medical students' depression (Bunevicius, Katkute, & Bunevicius, 2008; Shi, Liu, Yang, & Wang, 2015). Neuroticism had a positive relationship with medical students' anxiety, whereas agreeableness, conscientiousness and openness were negatively associated with it (Shi, Liu, Wang, & Wang, 2015). Mirroring these relationships, in our study some of the Big Five personality traits were significant predictors of quarter-life crisis. Higher neuroticism, which indicated emotional instability, predicted higher quarter-life crisis. Higher extraversion and conscientiousness predicted lower quarter-life crisis.

5. LIMITATIONS AND FUTURE DIRECTIONS

Among the limitations of our study we have to point out the unequal distribution of our sample regarding the year of study. Since fifth- and sixth-year students were overrepresented, the measured level of quarter-life crisis could be

biased. Second, our methods did not make it possible to draw conclusions on causality between the examined variables and quarter-life crisis. Future longitudinal studies should address the direction of these relationships. Third, data collection was carried out prior to the COVID-19 era. Emerging adulthood and quarter-life crisis can be largely affected by the epidemic, especially in the case of medical students, who are very often ordered to take part in practical tasks like testing and administration. Curriculum also had to be adapted to the situation, some subjects switched to online, practices were cancelled during the lockdowns. Based on these limitations future studies might explore how these challenges affect medical students' emerging adulthood and quarter-life crisis. Finally, the dichotomous questions in our questionnaire might have not provided as sophisticated a way of data collection as a typical Likert scale.

6. CONCLUSION

Our findings contribute to the 'university as a social context' concept (Raikou & Konstantopoulou, 2021) according to which university affects the prolonged identity formation and development of independency we call emerging adulthood, and its possible consequence, quarter-life crisis. Some variables relating to pre-school circumstances, students' attitude about medical school, studies and finally future career plans associated with medical students' quarter-life crisis. We conclude that these variables can be possible indicators of medical students' quarter-life crisis. Furthermore, during a university counseling, they can promote the elaboration of the client's problem too, when quarter-life crisis, difficulties in study-job transition, emerging adulthood, and professional identity are in focus. For example, the 'Would you recommend medical school to your children?' question would raise other ones, giving a deeper understanding and insight into the client's current condition. Based on these findings, we can conclude that Big Five personality profile can be a possible method to screen risk population of quarter-life crisis among medical students.

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Conflict of interest: The authors declare that they have no conflict of interest.



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APPENDIX: QUARTER-LIFE CRISIS QUESTIONNAIRE¹

How characteristic the following statements are of you?

- 1 Extremely uncharacteristic
- 2 Hardly characteristic
- 3 To some degree characteristic
- 4 Characteristic
- 5 Extremely characteristic

I feel that nothing is terribly wrong, but nothing seems right either in my life.	1	2	3	4	5
I feel older for the first time in my life.	1	2	3	4	5
I am unmotivated and passionless.	1	2	3	4	5
I feel that the world opened up to me, and life is full of fantastic opportunities ready to be discovered.	1	2	3	4	5
I am concerned that I don't know what I want to do with my life.	1	2	3	4	5
I feel entitled to a life much grander than the one I am living.	1	2	3	4	5
I often feel anxious, overwhelmed and depressed.	1	2	3	4	5
I feel a lot of pressure and everybody expects me to do something or be something.	1	2	3	4	5
I feel that my career has a very good progress.	1	2	3	4	5
Sometimes I feel that time is running out in regards to figuring out my career.	1	2	3	4	5
I am worried that the happiness in my private life comes to the detriment of my career.	1	2	3	4	5
I am stressed out by serious choices that seemingly will affect the rest of my life.	1	2	3	4	5
I am proud of already exactly knowing what to do with my life.	1	2	3	4	5
I am experiencing confusion or disappointment in my career.	1	2	3	4	5
I easily make decisions, even about serious issues too.	1	2	3	4	5
I feel that I have failed because I don't know what I want to do with my life.	1	2	3	4	5
I feel lost, and meaningless.	1	2	3	4	5
I am not bothered if I actually do not have a relationship.	1	2	3	4	5
Sometimes I feel that time is running out in regards to figuring out whether I want to get married and/or have children.	1	2	3	4	5
I know what I want to do, but can't seem to make it work.	1	2	3	4	5
It is difficult for me to make decisions and when I do, I regret them.	1	2	3	4	5
I overanalyze myself.	1	2	3	4	5
My future does not worry me at all, everything will click into place.	1	2	3	4	5
I feel guilty of having disappointed people (especiall my parents).	1	2	3	4	5
I am ashamed and embarrassed that I have not figured out yet what to do with my life.	1	2	3	4	5
Maybe I do not know yet what I will do later, but I am looking forward to it with full of anticipation.	1	2	3	4	5
I am stressed out a lot in my relationship.	1	2	3	4	5
I am still living at home with my parents.	1	2	3	4	5
I frequently compare myself to other people my age and feel like I don't measure up.	1	2	3	4	5
I feel that I am completely right on the track.	1	2	3	4	5

¹ Development, psychometric properties, items and dimensions of the original Quarter-Life Crisis Questionnaire (Vida, 2011) are available on https://www.feta.hu/sites/default/files/feta_konyv_6_belivek.pdf



I am worried about my financial state.	1	2	3	4	5
I am pleased with my life.	1	2	3	4	5
There are too many constant changes regarding my future and this makes me worried.	1	2	3	4	5
I feel my self-esteem could use an upgrade.	1	2	3	4	5
I am thinking about going back to grad school because I don't know what else to do with my life.	1	2	3	4	5
I am constantly thinking about the future resulting in anxiety and even panic.	1	2	3	4	5
I am looking forward to becoming independent financially from my parents.	1	2	3	4	5
My life just is not at all turning out like I planned.	1	2	3	4	5
I feel that the whole fantastic life is ahead of me.	1	2	3	4	5
I feel that there are too many possibilities and I cannot opt from them.	1	2	3	4	5
I am worried whether I find my life partner.	1	2	3	4	5
I am confident regarding my career choice.	1	2	3	4	5
The thought, that I have to become financially independent soon, makes me worried.	1	2	3	4	5
I feel that figuring out what to do with my life is so hard, that I tend to procrastinate this decision.	1	2	3	4	5
I feel that there are too many uncertain and unpredictable factors in my future.	1	2	3	4	5
I am sure that my future will turn out better than most of my peers'.	1	2	3	4	5

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