Psihičko zdravlje *geekova* / *Mental Health of Geeks*

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Susresti nekoga koga možemo smatrati *geekom*, odnosno stručnjakom za neki interes vezan za pop kulturu ili izmišljene svjetove kojim se intenzivno bavi, sve je češća pojava. Uz *geekove* se vežu i negativni stereotipi koji impliciraju da imaju problema s psihičkim zdravljem zbog svojih aktivnosti, pretpostavka koju ovaj rad provjerava na dva načina. Prvo je uspoređeno psihičko zdravlje *geekova* i pripadnika opće populacije, uključujući i psihološku uznemirenost i zadovoljstvo životom. Zatim su ispitani odnosi psihičkog zdravlja i triju motivacija za *geek*-aktivnosti (potreba za pripadanjem, aktivna uključenost i migracija u izmišljeni svijet). Podatci su prikupljeni u Hrvatskoj *online* upitnikom 1219 pojedinaca uključenih u *geek*-aktivnosti. *Geekovi* su imali isto ili bolje psihičko zdravlje u odnosu na uzorke iz opće populacije iz drugih istraživanja. Prihvaćanje *geek*-aktivnosti od bliskih osoba te manje izražen grandiozni narcizam i osjećaj povlaštenosti su očekivano bili povezani s manje simptoma psihičkih poremećaja i/ili većim zadovoljstvom životom, dok je viši stupanj uključenosti u kreativne *geek*-aktivnosti neočekivano predviđao više simptoma psihičkih poremećaja. Ovi rezultati impliciraju da je potreba za pripadanjem kao motivacija za *geek*-aktivnosti zaštitni faktor, a migracija u izmišljeni svijet kao motivacija za *geek*-aktivnosti faktor rizika za psihičko zdravlje.

/ Being a geek, i.e., an expert heavily invested in an interest related to pop culture or invented worlds, is becoming more common these days. There are negative stereotypes concerning geeks implying they might have mental health issues due to their geek activities, the assumption this study explores. First, geeks are compared to the general population on mental health – both the psychological distress and life satisfaction. Second, the relationships of mental health to three motivations for geek activities (need for belongingness, desire for engagement and great fantasy migration) are explored. The data were collected via an online questionnaire from 1219 Croatian individuals who participate in geek activities. Geeks had the same amount or less mental health issues compared to general population samples from the previous studies. Acceptance of geek activities by others, lower grandiose narcissism and entitlement predicted lower psychological distress and/or higher life satisfaction in geeks, as expected, while more engagement in creative geek activities unexpectedly predicted higher psychological distress. This implies that the need for belongingness as a motivation for geek activities is a protective factor and that the migration to the fantasy world as a motivation for geek activities is a risk factor for mental health.

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UVOD

Vjerojatnost da susretnemo osobu koju možemo smatrati *geekom* nije tako mala, pogotovo s obzirom na njihovu učestalost u populaciji i porast njihove popularnosti (1,2). Ako vjerujemo medijima i stereotipima, vjerojatnost je prilično visoka da je taj *geek* osoba koju smo susreli socijalno nesposobna i ima „psihičkih problema" (3,4,5). Ovaj rad istražuje pretpostavku da *geekovi* imaju ugroženo psihičko zdravlje zbog svojih *geek*-aktivnosti. Ali što je točno *geek* i što ljudi misle da je *geek*?

Različiti autori se uglavnom slažu da je *geek* osoba koja se aktivno i intenzivno bavi interesima vezanim za pop kulturu i izmišljene svjetove i stručnjak je u tom polju (3,4,6,7). Ti interesi uključuju neke opće kategorije kao što su znanstvena fantastika i fantastika, kao i specifične aktivnosti poput igranja računalnih igara i igranja uloga (engl. *role-playing games*). Detaljniji popis ovih interesa nalazi se u radu McCain i sur. (3), a popis prilagođen hrvatskom kontekstu u radu Mikac i sur. (8). Često ne možemo saznati je li netko *geek* tako da ga to izravno pitamo, jer ljudi koje možemo prema prije navedenoj definiciji smatrati *geekovima* često o sebi razmišljaju u terminima interesa koji im je najizraženiji (3,8). Na primjer, ako se netko najviše bavi računalnim igrama, reći će za sebe da je igrač računalnih igara (engl. *gamer*), ali ne nužno i da je *geek*. Drugi mogući razlog zašto se pojedinci ne poistovjećuju s izrazom *geek* jest što se uz njega vežu neke negativne osobine zbog mnogobrojnih negativnih stereotipa.

U prošlosti se smatralo da su *geekovi* uglavnom bijelci muškog roda, socijalno nesposobni i nesposobni razlikovati stvarno i izmišljeno, infantilni i nezreli te neuspješni u stvarnom životu (2,3,4,9). Postojali su i neki pozitivni stereotipi, recimo da su inteligentni, tehnološki napredni i zainteresirani za učenje. U zadnje vrijeme, stereotipi postaju sve više pozitivni i biti *geek* je sve više prihvaćeno u društvu (7,10). Jedan

INTRODUCTION

The probability of encountering a geek is not so small, given their frequency in the population and the rise in their popularity (1,2). If we are to trust the media and the stereotypes, the probability that the geek we encountered is socially inept and has "psychological problems" is also quite high (3,4,5). This paper explores the assumption that geeks have mental health issues due to their geek activities. But what exactly is a *geek*, and what do people think a *geek* is?

Different researchers mostly agree that a geek is a person who is heavily and actively invested in an interest related to pop culture and invented worlds and is an expert in that field (3,4,6,7). These interests include general categories, like science fiction and fantasy genres, and specific activities, like computer and role-playing games. An extensive list of these interests can be found in McCain et al. (3), and a list adapted to Croatian context in Mikac et al. (8). It cannot always be determined if someone is a geek by asking them, because people who fit this definition do not necessarily think of themselves as geeks (3,8). Such people often think of themselves mainly in terms of the geek interest that is more dominant than others, e.g. they might consider themselves computer gamers, but not geeks, if computer games are their most prominent interest. Another possible reason for not identifying with the label *geek* is that there are negative connotations related to it due to multiple negative stereotypes.

Until recently, geeks were considered to be mostly white males, socially inept, unable to discern reality from fantasy, infantile and immature, and unsuccessful in real life (2,3,4,9). There were also some positive stereotypes, like geeks being intelligent, technologically advanced, and interested in learning. Recently, the stereotypes have been changing to be gen-

od pokazatelja toga je suvremeni modni trend koji promiče *geek* kulturu, tzv. *geekchic* (10), a drugi su prikazi *geekova* u suvremenim medijima u pozitivnom svjetlu, kao što su serije *The Stranger things* i *The Big Bang Theory* (1). Međutim, čak i u njima su još uvijek prisutni neki negativni stereotipi, kao na primjer socijalna nesposobnost.

Budući da ni za jednu od ovih stereotipnih osobina nije utvrđeno da je zajednička svim *geekovima*, te osobine nisu uključene u definiciju *geeka* (3,4,6,7). Međutim, upućuju li ovi stereotipi na to kakva je većina *geekova*? Jesu li *geekovi* skloniji neuspjehu i poteškoćama u snalaženju u životu, bilo socijalno, bilo na nekoj općenitijoj razini? Ako je to zaista tako, onda možemo očekivati da imaju sniženu kvalitetu života i/ili više simptoma psihičkih poremećaja, odnosno, stereotipi impliciraju da je psihičko zdravlje *geekova* ugroženo samim time što su *geekovi*, odnosno preciznije, samim time što se bave *geek*-aktivnostima s obzirom da je, prema opće prihvaćenoj definiciji bavljenje aktivnostima upravo ono što nekog čini *geekom* (3,4,6,7). No, u podlozi uključivanja u *geek* aktivnosti mogu biti različite motivacije (3), koje mogu biti na različite načine povezane s psihičkim zdravljem zbog čega i samo bavljenje *geek*-aktivnostima može biti različito povezano s psihičkim zdravljem. Iz toga slijedi da je za razumijevanje psihičkog zdravlja *geekova* važno razmotriti i motivacije za uključivanje u *geek* interese, odnosno u aktivnosti povezane s tim interesima.

McCain i sur. (3) predlažu tri glavne motivacije za uključivanje u *geek* aktivnosti zasnovane na njihovom pregledu antropološke, komunikacijske i psihologijske literature. Prva od ovih motivacija je *migracija u izmišljeni svijet*. Ona se zasniva na pretpostavci da se pojedinci koji imaju pretjerano pozitivnu sliku o sebi u odnosu na stvarni svijet i prevelike razlike između svojih očekivanja i stvarnosti ponekad pokušavaju ostvariti u izmišljenim svjetovima, npr. tako da budu junak u igri. Na neki način oni migri-

erally more positive and geeks are more accepted in the society (7,10). One indication of this is the modern fashion movement endorsing the geek culture, so called *geek chic* (10), and another are the instances in the modern media that have multiple positive representations of geeks, like *Stranger Things* and *The Big Bang Theory* series (1). However, even there, some of the negative stereotypes often persist, e.g., social ineptness.

As none of these stereotyped characteristics has been found to be common to all geeks, they were not included in the definition of what a geek is (3,4,6,7). However, might these stereotypes be indicative of what most geeks are like? Are geeks more prone to not finding their way in the world and being unsuccessful, either socially, or on a more general level? If so, they would be expected to have a lower life quality and/or more symptoms of psychological distress. That is, the stereotypes seem to imply that the mental health of geeks is lower simply due to them being geeks, or more precise, due to them engaging in geek activities, since this engagement is what makes one a geek according to the accepted definition (3,4,6,7). However, the motivations for engaging in geek activities may differ, and these motivations can be related differently to mental health, because of which the engagement in geek activities can be differently related to mental health. Therefore, to understand the mental health of geeks, one should take into account the motivation for engaging in geek interests and activities related to them.

McCain et al. (3) propose three main motivations for engaging in geek activities based on their review of anthropological, communications and psychological literature. First of these motivations is the *great fantasy migration*. The idea is that individuals that have inflated self-esteem cannot realize themselves in the real world due to big differences between their expectations and reality, so they try to accom-

raju u izmišljeni svijet gdje mogu biti iznimno uspješni i ostvariti povlašteni status i hvalu koju vjeruju da zaslužuju. Ako je to istina, onda će pojedinci s izraženijim narcizmom (u smislu crte ličnosti, ne poremećaja ličnosti), odnosno oni s izraženijom grandioznom slikom o sebi i izraženijim osjećajem povlaštenosti biti skloniji migraciji u izmišljeni svijet. Ova pretpostavka je već djelomično potvrđena, odnosno pokazalo se da se pojedinci s izraženijim narcizmom više uključuju u *geek* aktivnosti (3,11). Drugi mogući pokazatelji ove motivacije su sklonost maštanju i manja predanost aktivnostima u stvarnom životu, koji također mogu biti povezani s psihičkim zdravljem, no narcizam je od njih najčešće istraživan u kontekstu *geek* aktivnosti, vjerojatno zbog teorijskog značenja za pretpostavljenu motivaciju (3,11).

Druga motivacija koju ovi autori predlažu je osjećaj *pripadanja*. Prema ovoj hipotezi, *geekovi* sudjeluju u *geek* aktivnostima jer to zadovoljava njihovu potrebu za pripadanjem. Pridruživanje skupini sa sličnim (*geek*) interesima utječe na naše samopoštovanje (12), koje ovisi o tome kako su aktivnosti karakteristične za tu skupinu prihvaćene od drugih (13). Dakle, bavljenje *geek* aktivnostima stvara osjećaj da je osoba dio *geek* skupine, a osjećaj da je osoba prihvaćena jer se bavi tim aktivnostima utječe na samopoštovanje, te se time ispunjava potreba za pripadanjem. Ovu hipotezu potvrđuju psihologijska i antropološka istraživanja o tome kako nastaju društvene mreže *geekova* i kako se održavaju odnosi među pripadnicima tih mreža, kao i nalaz o tome da prihvaćenost *geek* aktivnosti od drugih dovodi do pozitivnih emocija (2,3,14).

Treća moguća motivacija u podlozi bavljenja *geek* aktivnostima je želja za *aktivnom uključenosti*. U podlozi te želje je potreba da se bude aktivni sudionik medija, a ne samo pasivni potrošač tog velikog dijela suvremenog načina života. Mnoge *geek* aktivnosti su kreativne [npr., pisanje, izrada kostima i raznih predmeta (3)], što je skladu s hipotezom o aktivnoj uključeno-

plish their grandiose self in the fantasy worlds, e.g., by being a hero in a game. In a way, they migrate to the fantasy world where they can be great and get the status and praise, they feel entitled to. If this is true, the more narcissistic individuals (in terms of personality traits, not the personality disorder), characterized by having a more grandiose sense of self and a sense of entitlement, will be more prone to this migration into the fantasy. Indeed, more narcissistic individuals have been shown to engage in geek activities more (3,11). Other possible indicators of this motivation are fantasy proneness and less engagement in real life goals, which could also be related to mental health. However, narcissism is the most researched indicator in the context of geek activities, probably due to its theoretical relevance to the hypothesised motivation (3,11).

The second motivation these authors propose is the feeling of *belongingness*. According to this hypothesis, geeks participate in geek activities because it fulfils their need to belong. Joining a group with similar (geek) interests defines partly one's self-esteem (12), and self-esteem depends on how activities characteristic for this group are accepted by others (13). Therefore, doing geek activities makes one feel part of a geek group and being accepted for doing them defines one's self-esteem, and thus fulfils one's need to belong. This hypothesis is supported by psychological and anthropological studies showing how geek networks are formed and relationships maintained, as well as how acceptance of geek activities by others leads to positive emotions (2,3,14).

The third possible motivation for geek activities is the *desire for engagement*. This desire is characterized by the need to be an active participant in the media, as opposed to being just a passive consumer of this large part of modern life. Many geek activities are creative (e.g., writing, making costumes and accessories (3)), which would be in accordance with the active partici-

sti u sadržaje povezane s medijima. McCain i sur. (3) smatraju da bi ovakav aktivni pristup trebao biti izraženiji kod osoba s većom potrebom za stimulacijom, što su poduprli pokazavši da su osobe otvorenije k iskustvu više uključene u *geek* aktivnosti. Isti autori pretpostavili su druge korelate ove motivacije kao što su traženje uzbuđenja i inteligencija, no njihovo istraživanje nije potvrdilo ta očekivanja (3).

Ove motivacije mogu dovesti do različitih ishoda što se tiče psihičkog zdravlja. Ako su *geek* aktivnosti motivirane potrebom za pripadanjem, što je ta potreba više zadovoljena uključivanjem u *geek* aktivnosti, to će psihičko zdravlje biti bolje jer je više zadovoljena jedna od bazičnih ljudskih potreba (15). Slično se može pretpostaviti i ako je motivacija za *geek* aktivnosti aktivna uključenost, iako potreba za stimulacijom nije jedna od bazičnih potreba (15). Za razliku od toga, ako su *geek* aktivnosti uglavnom motivirane migracijom u izmišljeni svijet, to može dovesti do veće psihološke uznemirenosti. Naime, iako je potreba za postignućem zadovoljena u izmišljenom svijetu, pojedinci se svejedno u jednom trenu moraju vratiti u stvarni svijet gdje je ova potreba osujećena, što može dovesti do javljanja simptoma psihičkih poremećaja (15).

Pri ispitivanju psihičkog zdravlja važno je uzeti u obzir da njega čine dva povezana ali različita aspekta, pozitivno psihičko zdravlje i psihički poremećaji (16). Dugo je dominantan pristup psihičkom zdravlju pretpostavljao da se ono može opisati jednom bipolarnom dimenzijom na čijem se jednom kraju nalazi psihičko zdravlje, a na drugom psihički poremećaji. Istraživanja pokazuju da je psihičko zdravlje bolje opisati s dvije međusobno povezane dimenzije: pozitivno psihičko zdravlje (engl. *mental health* ili *positive mental health*) koje opisuju subjektivna dobrobit, zadovoljstvo životom i srodni konstrukti, te psihički poremećaji (engl. *mental illness* ili *psychological distress*) koji se odnose na prisutnost odnosno odsutnost psihičkih poremećaja. Pret-

pation in media related activities. McCain et al. (3) propose that this active approach might be more pronounced for those with a greater need for stimulation, which they supported by showing that individuals more open to experience are more engaged in geek activities. The same authors proposed other possible correlates of this motivation, such as sensation seeking and intelligence, however, their research did not confirm the initial expectations (3).

These motivations may lead to different outcomes regarding mental health. If geek activities are motivated by the need to belong, then the more that need is fulfilled by being a geek, the better one's mental health will be because one of the basic human needs is more fulfilled (15). Similar might be valid if the motivation for geek activities is the desire for engagement, although the need for stimulation might not be considered one of the basic needs (15). On the contrary, if geek activities are mainly motivated by the great fantasy migration, this might lead to more psychological distress. Namely, although the need for accomplishment is fulfilled in the fantasy world, eventually the individuals must come back to the real world where this need is thwarted, perhaps leading to a further escalation of mental illness symptoms (15).

An important point to take into account when examining mental health is that it is composed of two interrelated but distinct aspects, positive mental health and psychological distress (16). For a long time, the dominant approach to mental health was based on the assumption that mental health is a bipolar dimension, with mental health on one end, and mental illness on the other. However, research has shown that it can be better described with two interrelated dimensions: positive mental health (or mental health) described by subjective wellbeing, life satisfaction and similar constructs; and mental illness (or psychological distress), which refers to presence or absence of psychopathology. That is, while assuming the bipolar dimension

postavimo li bipolarnu dimenziju, možemo razlikovati osobe kod kojih nisu prisutni psihički poremećaji i zadovoljni su životom te osobe koje imaju psihičke poremećaje i nisku kvalitetu života, dok dvojni model pretpostavlja da postoje i osobe koje imaju psihičke poremećaje ali i osjećaj subjektivne dobrobiti, kao i oni koji nemaju psihičke poremećaje, ali su nezadovoljni životom (16). Ove dvije dimenzije psihičkog zdravlja imaju i različite prediktore i posljedice. Neki od tih prediktora su i potrebe, odnosno ove dvije dimenzije psihičkog zdravlja nisu na isti način povezane sa zadovoljavanjem i osujećivanjem potreba (15). Zbog toga je pri ispitivanju povezanosti psihičkog zdravlja *geekova* s njihovom motivacijom za *geek* aktivnosti potrebno uzeti u obzir obje ove dimenzije psihičkog zdravlja.

CILJ

Kako bi se istražila pretpostavka koja proizlazi iz stereotipa da *geekovi* imaju lošije psihičko zdravlje samim time što su *geekovi*, odnosno zbog *geek* aktivnosti kojima se bave i koje su definirajuća osobina *geekova*, psihičko zdravlje *geekova* je uspoređeno sa zdravljem opće populacije. To je uključivalo zadovoljstvo životom kao pokazatelja pozitivnog psihičkog zdravlja i simptome depresije, anksioznosti i stresa kao pokazatelje psihičkih poremećaja. S obzirom da su podatci o psihičkom zdravlju *geekova* prikupljeni u specifičnom kontekstu pandemije, za usporedbu su korišteni podatci iz drugih istraživanja o psihičkom zdravlju provedenih u slično vrijeme u Hrvatskoj (17,18). Zatim je ispitano može li se, unutar skupine *geekova*, lošije psihičko zdravlje objasniti različitim motivacijama za uključivanje u *geek* aktivnosti. Kako bismo zahvatili različite motivacije, korišteni su pokazatelji predloženi kao relevantni za svaku od pojedinačnih motivacija u prijašnjim istraživanjima (3,11). Kao pokazatelj intenziteta migracije u izmišljeni svijet kao motivacije za *geek* aktivnosti korišten je narcizam kao osobina lič-

meant that people can be thought of as either not having a psychological disorder and being satisfied with life, or as having a psychological disorder and having a low quality of life, dual-factor model assumes there are people who have a psychological disorder but have a sense of wellbeing, as well as people who do not have a psychological disorder, but are unsatisfied with their life (16). These two dimensions of mental health have different antecedents and consequences. Some of these antecedents included needs, that is, these two dimensions are not related in the same way to need satisfaction and thwarting (15). Therefore, both of these dimensions need to be accounted for when exploring the relations of mental health of geeks to the motivations for engaging in geek activities.

OBJECTIVE

In order to explore the assumption implied by the stereotypes that geeks have mental health issues due to them being geeks, i.e., due to them engaging in geek activities, which is their defining characteristic, first, the mental health levels of geeks were compared to that of a general population. This included the positive mental health indicated by life satisfaction, and psychological distress indicated by depression, anxiety and stress symptoms. Considering the data on geek mental health was collected during the specific context of the pandemic, data from other research on mental health collected at a similar time in Croatia was used for comparison (17,18). Second, it was explored whether, among geeks, lower mental health can be explained by the motivations for engaging in geek activities. To capture the different motivations, indicators proposed by previous research as relevant for each of the motivations were used (3,11). The intensity of great fantasy migration as a motivation was indicated by narcissistic personality, the need

nosti, kao pokazatelj potrebe za pripadanjem korištena je percipirana razina prihvaćenosti pojedinčevih *geek* aktivnosti, a kao pokazatelj aktivne uključenosti korištena je razina uključenosti u kreativne *geek* aktivnosti.

METODE

Sudionici i postupak istraživanja

Poziv za sudjelovanje u istraživanju provedenom putem *online* upitnika upućen je u lipnju i srpnju 2020. preko e-pošte, *facebook* grupa i plakata raznim organizacijama i pojedincima koji su uključeni u geek aktivnosti (npr. organizatorima geek konvencija, ljubiteljima društvenih igara, obožavateljima Harryja Pottera). Popis *geek* aktivnosti korišten za određivanje ovih kontakata nastao je prilagodbom popisa iz istraživanja McCain i sur. hrvatskom kontekstu (3,8). Svi sudionici su dali informirani pristanak prije početka ispunjavanja upitnika. U skladu s definicijom da je *geek* osoba koja se aktivno bavi interesima vezanim za pop kulturu i izmišljene svjetove, sudionici su smatrani *geekovima* ako su označili da se aktivno bave barem jednom od aktivnosti koje su klasificirane kao specifične za *geekove* (3,8), a popis kojih je prezentiran sudionicima u sklopu Ljestvice uključenosti u *geek* zajednicu. Od 1318 osoba koje su pristupile upitniku, 99 nije izjavilo da su uključeni u ijednu *geek* aktivnost te ih nismo mogli smatrati *geekovima* prema utvrđenoj definiciji zbog čega njihovi podatci nisu korišteni u daljnjim obradama. Istraživanje je odobrilo Etičko povjerenstvo Odsjeka za psihologiju Filozofskog fakulteta Sveučilišta u Zagrebu.

Osnovni uzorak je sačinjavalo 1219 osoba, od kojih su 52,3 % muškarci, a 46,5 % žene. Prosječna dob je bila 30,8 (*SD*=7,94) godina. Karakteristike uzorka prikazane su u tablici 1. Dio obrada podataka je napravljen na čitavom uzorku (povezanost motivacija i psihičkog zdravlja) koristeći metodu maksimalne vjerojatnosti

for belongingness by the perceived level of acceptance of one's geek activities, and the desire for engagement by the level of engagement in creative geek activities.

METHODS

Participants and procedure

The invitation to participate in the study by taking an online questionnaire was distributed in June and July of 2020 via emails, Facebook groups and posters to various organizations and individuals involved in geek activities (e.g., geek convention organisers, board game enthusiasts, Harry Potter fans). The list of geek activities used to identify contacts was adapted to Croatian context from McCain et al. (3,8). All participants gave an informed consent before starting the questionnaire. In accordance with the geek being defined as a person actively invested in an interest related to pop culture and invented worlds, the participants were considered to be geeks if they stated they are actively engaged in at least one of the activities classified as specific to geeks (3,8), the list of which was presented to participants as part of the Geek Culture Engagement Scale. Out of 1318 individuals who started the questionnaire, 99 did not indicate they were involved in any of the geek activities and could not therefore be considered geeks according to the used definition and were excluded from further analyses. This study was approved by the Ethical Committee of the Department of Psychology, Faculty of Humanities and Social Sciences of the University of Zagreb.

The main sample consisted of 1219 individuals, 52.3% of which were men, and 46.5% women. The mean age was 30.8 (*SD* = 7.94). The characteristics of this sample are shown in Table 1. Part of the analyses was done on this sample (the relations of motivations and mental health) with full information maximum likeli-

sa svim informacijama (engl. *full information maximum likelihood*) kao metodu postupanja s podatcima koji nedostaju (19). Analize razina psihičkog zdravlja su pak rađene na poduzorku. Naime, kod usporedbe s drugim istraživanjima bilo je bitno provjeriti usporedivost uzoraka prema sociodemografskim karakteristikama te su stoga te analize rađene na poduzorku od 725 sudionika koji su imali podatke na relevantnim varijablama. Njihova prosječna dob bila je 31,8 (*SD* = 7,81) godina, u prosjeku 2,5 godine viša od sudionika čiji podatci nisu bili uključeni u te analize [$t(1214) = 5.94$, $p < .001$]. Ova dva poduzorka su uspoređena χ^2 testom i prema drugim sociodemografskim karakteristikama (tablica 1). S obzirom na osjetljivost ovog testa na velike uzorke, pri interpretaciji razlika korišten je i Cramerov V za procjenu veličine učinka (20,21,22). Poduzorak korišten za analize razina psihičkog zdravlja imao je manje sudionika sa srednjoškolskim obrazovanjem, više zaposlenih i manje studenata nego poduzorak koji nije korišten u analizama. Razlike u statusu veze vjerojatno nisu bile od praktičnog značenja (s obzirom na malu veličinu učinka), dok u drugim sociodemografskim karakteristikama nije bilo statistički značajnih razlika (tablica 1).

Mjerni instrumenti i korištene mjere

Online upitnik je uključivao više različitih mjera od kojih smo u ovom radu koristili sljedeće:

Od *sociodemografskih podataka* prikupljeni su podatci o rodu, dobi, razini obrazovanja, statusu romantične veze i roditeljstva na početku upitnika, te o radnom statusu, mjestu prebivališta i subjektivnom socioekonomskom statusu na kraju upitnika.

Geek aktivnosti smo mjerili pomoću hrvatske adaptacije Ljestvice uključenosti u *geek* zajednicu (engl. *Geek Culture Engagement Scale*)(3,8). Ova ljestvica sadržava popis 17 aktivnosti prepoznatih kao karakteristične za *geekove* od McCain i

hood as missing data treatment method (19). The analyses of mental health levels were performed on a subsample. Specifically, when comparing with other research, comparability of samples regarding the sociodemographic characteristics needed to be established, so these analyses were performed on a subsample of 725 participants that had the data on relevant variables. Their mean age was 31.8 (*SD* = 7.81), on average 2.5 years older than the participants whose data was not used in these analyses, $t(1214) = 5.94$, $p < .001$. These two subsamples were further compared with chi square tests on other sociodemographic characteristics (Table 1). Given the sensitivity of this test to large samples, the effect size, as indicated by Cramer's V, was also taken into account when judging the relevance of the difference (20,21,22). The subsample used in the mental health levels analyses had less participants with high school as education attainment, more of them employed and less students than the subsample not used in these analyses. The differences in relationship status were probably not of practical relevance (as indicated by the small effect size) and there were no statistically significant differences in other sociodemographic characteristics (Table 1).

Instruments and measures

The online questionnaire included multiple measures, out of which the following were used in this study:

Sociodemographic data collected included gender, age, educational attainment, status of romantic relationship and parenthood at the beginning of the questionnaire, and working status, place of residence and subjective socioeconomic status at the end of the questionnaire.

Geek activities were measured by the Croatian adaptation of the Geek Culture Engagement Scale (3,8). This scale includes a list of 17 activities recognized as characteristic for geeks by

TABLICA 1. Sociodemografske karakteristike čitavog uzorka (*N* = 1219) i poduzorka korištenog u analizama razina psihičkog zdravlja (*n* = 725) u usporedbi s poduzorkom koji nije korišten
TABLE 1. Sociodemographic characteristics of the whole sample (*N* = 1219) and the subsample used in the analyses of mental health levels (*n* = 725) compared to the subsample not used

Karakteristika / Characteristic	Kategorija / Category	Čitav uzorak / Whole sample		Poduzorak / Subsample	Usporedba / Comparison[b]	
		n[a]	%	%	χ2(df) *p*	Cramer v
Rod / Gender	Muškarci/ Men	1217	52.4	53.9	1.93 (2) .38	.04
	Žene/ Women		46.6	45.2		
	Drugo / Other		1.0	0.8		
Razina obrazovanja / Educational attainment	Osnovna škola / Elementary school	1216	1.4	0.8	46.32 (4) <.001	.2
	Srednja škola / High school		29.9	24.0		
	Preddiplomski studij/ Bachelor's degree		22.3	22.9		
	Diplomski studij / Master's degree		37.4	40.3		
	Poslijediplomski studij / Postgraduate studies		9.0	12.0		
Status romantične veze / Romantic relationship	Ne u vezi / No relationship	1217	37.9	33.9	14.26 (2) .001	.11
	Veza bez zajedničkog života/ Relationship without cohabitation		19.8	19.7		
	Veza uključujući zajednički život / Relationship including cohabitation		42.3	46.3		
Predškolska ili školska djeca / Preschool or school children	Da / Yes	1217	18.7	17.9	0.62 (1) .433	.02
	Ne / No		81.3	82.1		
Radni status / Working status	Zaposlen / Employed	777	60.5	63.2	50.42 (4) <.001	.25
	Privremeno zaposlen / Temporary position		3.5	3.7		
	Nezaposlen / Unemployed		8.4	8.0		
	Student ili učenik / Student or pupil		23.8	21.1		
	Umirovljenik / Retired		3.9	4.0		
Mjesto prebivališta / Place of residence	>500 000	778	42.5	42.6	4.81 (3) .186	.08
	100 000-500 000		10.4	9.9		
	10 000-100 000		24.7	24.4		
	<10 000		22.4	23.0		
Subjektivni socioekonomski status / Subjective socioeconomic status[c]	Izrazito lako / Very easy	733	15.8	16.0	8.24 (5) .143	.11
	Prilično lako / Quite easy		26.6	26.8		
	Lako / Easy		29.5	29.4		
	Malo teže / A bit hard		22.5	22.5		
	Prilično teško / Quite hard		5.2	5.0		
	Izrazito teško / Very hard		0.4	0.4		

Legenda. [a]Veličine uzoraka razlikuju se zbog podataka koji nedostaju i položaja pitanja u upitniku (na početku/ na kraju); [b]Usporedba između poduzoraka koji jesu i nisu uključeni u analize kojima se uspoređuju razine psihičkog zdravlja *geekova* s onima iz drugih istraživanja; [c] *Kako izlazite na kraj s troškovima života?*
/ Note. [a] The sample size varies due to missing data and placement at the start/end of the questionnaire; [b]Comparison between the subsamples used and not used in analyses comparing mental health levels of geeks to that in other studies; [c] *How easy it is for you to cope with living expenses?*

sur. (3) te hrvatskih *geekova* (8), kao što su *znanstvena fantastika* ili *računalne igre*. Za svaku aktivnost sudionici procjenjuju koliko se često bave njome na ljestvici od 1 (*nimalo*) do 5 (*mnogo*). Odgovori sudionika na ovaj upitnik su u ovom radu korišteni na tri načina. Prvo, korišteni su za isključivanje sudionika koji nisu odgovorili više od 1 na ijednu od aktivnosti, što znači da nisu aktivno uključeni ni u jednu *geek* aktivnost te se zbog toga ne mogu smatrati *geekovima*.

Drugo, pokazatelj *uključenosti u kreativne geek aktivnosti* je izražen kao zbroj odgovora za tri aktivnosti koje se mogu smatrati kreativnima: *Cosplay (izrada i nošenje kostima likova iz igranih i animiranih filmova, serija, stripova itd.), Kreativno pisanje (prozne fikcije, poezije itd.)* i *Crafts (kreativni ručni rad, npr. crtanje, izrada nakita i oružja, bojenje minijatura)*. Ova mjera je pokazala jednofaktorsku strukturu kojom je objašnjeno 32 % ukupne varijance te pouzdanost McDonald's ω = .55 / Cronbach α = .52.

Treće, rješavaču su prikazane *geek* aktivnosti za koje je dao najviše odgovore te je njegov zadatak bio izabrati tri najvažnije i poredati ih po važnosti od najvažnije do najmanje važne. Ova informacija je korištena u sljedećoj mjeri:

Prihvaćenost geek aktivnosti izmjerena je pomoću tri pitanja. Zadatak rješavača bio je procijeniti kako njima bliski ljudi reagiraju kad se rješavač uključi u određenu *geek* aktivnost na ljestvici od 1 (*mnogi me ljudi odbacuju ili izbjegavaju*) do 5 (*mnogi me ljudi prihvaćaju*). Ovo pitanje je postavljeno za svaku od tri aktivnosti koje je rješavač prethodno izabrao kao najvažnije. Ukupni rezultat je izražen kao prosjek odgovora na ova tri pitanja. Mjera je pokazala jednofaktorsku strukturu kojom je objašnjeno 59 % varijance i pouzdanost ω/α = .81.

Upitnik narcisoidne ličnosti (engl. The *Narcissistic Personality Inventory,* NPI-16) (23) [hrvatski prijevod iz (8)] je upitnik koji mjeri narcizam kao osobinu ličnosti koja se normalno distribuira u nekliničkoj populaciji. Sastoji se od 16 pari

McCain et al. (3) and Croatian geeks (8), e.g., *science fiction*, *computer games*. For each activity the participants have to rate how often they engage in them on a scale from 1 (*Not at all*) to 5 (*A lot*). The responses on this scale were used in three ways in this study. First, they were used to exclude participants that did not have an answer higher than 1 on any activities, indicating they are not actively invested in any geek interest, and therefore cannot be considered geeks.

Second, the indicator of *engagement in creative geek activities* was formed as the sum of responses to three activities that can be considered creative, i.e., *Cosplaying (making and wearing costumes of characters from movies, cartoons, TV series, comics, etc.)*, *Creative Writing (fiction, poetry, etc.)*, and *Crafts (creative handwork; e.g., drawing, crafting jewellery and weapons, miniatures)*. This measure showed a one-factor structure with 32% of the variance common and reliability of McDonald's ω = .55 / Cronbach α = .52.

Third, geek activities for which the participants had the highest responses were presented to the participant and they had to choose the three most important ones and order them from least to most important. This information was used in the following measure.

The acceptance of one's geek activities by others was measured by three questions. The participants had to rate how the people close to them react when the participants engage in a certain geek activity on a scale from 1 (*many people reject or avoid me*) to 5 (*many people accept me*). This question was asked for each of the three activities chosen as most important ones previously. The score was expressed as an average of response to these three questions. This measure showed a one-factor structure with 59% of the variance common and reliability of ω/α = .81.

The *Narcissistic Personality Inventory* (NPI-16) (23) [Croatian translation by (8)] is a question-

tvrdnji i zadatak rješavača je u svakom paru izabrati tvrdnju koja ga bolje opisuje. Upitnik nije pokazao jasnu faktorsku strukturu pri čemu je paralelna analiza ukazivala na pet faktora, a *scree* prikaz nije bio jednoznačan. Zadržano je najinterpretabilnije rješenje, trofaktorsko koje su predložili i autori upitnika, čime je objasnjeno 25 % varijance. Ukupni rezultati su izraženi kao prosjeci na tri podljestvice: Grandiozni (k = 4, ω/α = .53/.67) i Ranjivi narcizam (k = 4, ω/α = .38/.52), te Osjećaj povlaštenosti (engl. *entitlement*; k = 8, ω/α = .51/.51) pri čemu viši rezultati upućuju na viši narcizam.

Ljestvica depresivnosti, anksioznosti i stresa (engl. *Depression Anxiety Stress Scales,* DASS-21) (24,25) je upitnik namijenjen mjerenju simptoma u nekliničkim i kliničkim uzorcima. Rješavači procjenjuju svoje slaganje s jednom od 21 čestice na ljestvici od 0 (*uopće se nije odnosilo na mene*) do 3 (*gotovo u potpunosti ili većinu vremena se odnosilo na mene*). Utvrđena je očekivana trofaktorska struktura, pri čemu je objašnjeno 62 % varijance, kao i očekivane razine pouzdanosti (ω = .84-.91, α = .85-.90). Ukupni rezultati su izraženi kao prosjeci na tri podljestvice: Depresija (k = 7), Anksioznost (k = 7) i Stres (k = 7) pri čemu viši rezultati upućuju na više razine psihološke uznemirenosti.

Zadovoljstvo životom je jednočestična mjera subjektivne dobrobiti i pozitivnog psihičkog zdravlja, koja je u prethodnim istraživanjima pokazala zadovoljavajuću pouzdanost i valjanost (26). Zadatak rješavača je procijeniti koliko su zadovoljni životom na ljestvici od 0 (*potpuno nezadovoljan*) do 10 (*potpuno zadovoljan)*.

REZULTATI

Obrade podataka napravljene su pomoću računalnih programa IBM SPSS Statistics 25, Excel 2013 i R 4.0.2 (paketi lavaan, psych, MVN).

Kako bismo usporedili razine psihičkog zdravlja *geekova* s onima pripadnika opće populacije,

naire that measures narcissism as a personality trait normally distributed in the non-clinical population. It is composed of 16 pairs of statements and the respondents have to choose the one that better describes them. The factor solution was inconclusive, with parallel analyses indicating five factors and scree plot being unclear. The most interpretable solution was the three-factor solution suggested by the authors of the instrument, in which 25% of the variance was explained. The scores were expressed as averages on three subscales: Grandiose (k = 4, ω/α = .53/.67) and Vulnerable narcissism (k = 4, ω/α =.38/.52), and Entitlement (k = 8, ω/α = .51/.51), with higher results indicating higher narcissism.

Depression Anxiety Stress Scales (DASS-21) (24,25) is a questionnaire aimed at measuring symptoms in non-clinical and clinical samples. The respondents rate their agreement with one of the 21 items on a scale from 0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*). The expected three-factor structure was established with 62% of the variance explained, as well as expected levels of reliability (ω = .84-.91, α = .85-.90). The results were expressed as averages on three subscales, depression (k = 7), anxiety (k = 7) and stress (k = 7), with higher results indicating higher levels of psychological distress.

Life satisfaction is a one-item measure of subjective well-being and positive mental health, which showed good reliability and validity (26). The respondents' task is to rate how satisfied they are with life on a scale from 0 (*completely unsatisfied*) to 10 (*completely satisfied*).

RESULTS

The analyses were performed with IBM SPSS Statistics 25, Excel 2013 and R 4.0.2 (packages lavaan, psych, MVN).

To compare the levels of mental health of geeks to that of a general population, we compared

usporedili smo psihičko zdravlje ovog uzorka s psihičkim zdravljem dva uzorka za koje su podatci prikupljeni u sličnom kontekstu (tablica 2). Ajduković i sur. (17) imali su nacionalno reprezentativan uzorak, međutim uzorak *geekova* razlikovao se od njihovog prema svim sociodemografskim karakteristikama osim po rodu, $\chi^2(1) = 1.2$, p = .268, Cramerov V = .02. U *geek* uzorku sudionici su bili uglavnom mlađi ($\chi^2(5) = 554.8$, p < .001, Cramerov V = .47), viših razina obrazovanja ($\chi^2(3) = 93.9$, p < .001, Cramerov V = .19), manje ekstremnih prihoda (i visokih i niskih, $\chi^2(4) = 144.4$, p < .001, Cramerov V = .27), češće su bili studenti ($\chi^2(4) = 79.8$, p < .001, Cramerov V = .2), te su rjeđe živjeli s partnerom ($\chi^2(2) = 125.2$, p < .001, Cramerov V = .22), a češće u velikom gradu ($\chi^2(2) = 241.9$, p < .001, Cramerov V = .35) pri čemu su sve veličine učinka bile srednje do velike (20,21). Uzorak *geekova* imao je jednake razine anksioznosti kao i uzorak opisan u Ajduković i sur. (17), no imao je statistički značajno manje simptoma depresije i stresa, iako je veličina učinka bila relativno mala, te više zadovoljstvo životom, pri čemu je veličina učinka bila srednja do velika (tablica 2).

Geek uzorak razlikovao se prema sociodemografskim karakteristikama i od sudionika u istraživanju Jokić-Begić i sur. (18). *Geekovi* su bili mlađi ($t(3747) = 6.57$, $p < .001$), bilo je manje žena ($\chi^2(1) = 493.8$, p < .001, Cramerov V = .35) i više sudionika višeg socioekonomskog statusa ($\chi^2(5)$

the mental health of our sample to the mental health of two samples for which the data was collected in a similar context (Table 2). Ajduković et al. (17) used a nationally representative sample, however our sample differed from it on all measured sociodemographic characteristics except gender, $\chi^2(1) = 1.2$, p = .268, Cramer's V = .02. The participants in our sample were mostly younger ($\chi^2(5) = 554.8$, p < .001, Cramer's V = .47), with higher education attainment ($\chi^2(3) = 93.9$, p < .001, Cramer's V = .19), had less extreme income (both low and high, $\chi^2(4) = 144.4$, p < .001, Cramer's V = .27), were more often students ($\chi^2(4) = 79.8$, p < .001, Cramer's V = .2), less often in cohabitation with their partner ($\chi^2(2) = 125.2$, p < .001, Cramer's V = .22), and more often living in a large city ($\chi^2(2) = 241.9$, p < .001, Cramer's V = .35), with all of these effect considered medium to large (20,21).The geek sample had the same levels of anxiety symptoms as the sample in Ajduković et al. (17), but statistically significantly fewer symptoms of depression and stress, although the effect size was quite small, and higher satisfaction with life, with medium to large effect size (Table 2).

Our participants were also significantly different in sociodemographic characteristics from participants in Jokić-Begić et al. (18). They were younger ($t(3747) = 6.57$, $p < .001$), there were less women ($\chi^2(1) = 493.8$, p < .001, Cra-

TABLICA 2. Razlike u psihičkom zdravlju između *geekova* i uzoraka koji predstavljaju opću populaciju
TABLE 2. Differences in mental health between geeks and samples representing the general population

Pokazatelj psihičkog zdravlja / Mental health indicator	*Geekovi* / Geeks[a]	Ajduković *et al.* (16)[b]			Jokić-Begić *et al.* (17)[c]		
	M (*SD*)	*M* (*SD*)	*t* (*df*) *p*	*d*	*M* (*SD*)	*F* (*df*) *p*	η^2
Depresija / Depression	0.81 (0.75)	0.97 (1.22)	3.6 (1978) < .001	0.159	0.90 (0.87)	8.8 (1, 1405) .003	.006
Anksioznost / Anxiety	0.57 (0.64)	0.57 (0.99)	0.04 (1987) .969	0.002	0.55 (0.69)	0.4 (1, 1406) .528	.000
Stres / Stress	1.03 (0.78)	1.19 (1.3)	3.3 (1973) < .001	0.145	1.05 (0.85)	1.5 (1, 1406) .217	.001
Zadovoljstvo životom / Life satisfaction	7.16 (1.98)	5.6 (2.19)	16.7 (1884) < .001	0.747	6.75 (2.09)	6.7 (1, 1394) .010	.005

Legenda. Rezultati različitih istraživanja svedeni su na istu ljestvicu u svrhu lakše usporedbe. [a]*N* = 787-827. [b]*N* = 1201. [c]*N* = 686-701.
/ Note. Results from different studies were transformed to the same scale to ease comparison.[a]*N* = 787-827. [b]*N* = 1201. [c]*N* = 686-701.

= 135.5, p < .001, Cramerov V = .22). Postojale su i statistički značajne razlike u razini obrazovanja ($\chi^2(4) = 27.3$, p < .001, Cramerov V = .08) i statusu romantične veze ($\chi^2(2) = 68.7$, p < .001, Cramerov V = .14), no uzmemo li u obzir osjetljivost χ^2 testa kod velikih uzoraka i ostvarenu malu veličinu učinka (20,21), ove razlike vjerojatno nisu bile od praktične važnosti. U radnom statusu nije bilo značajnih razlika ($\chi^2(4) = 6.2$, p = .188, Cramerov V = .04). Osobnom korespondencijom s autorima (18) dobiveni su podatci na kojima su provedene sekundarne analize kojima smo pokušali statistički kontrolirati postojeće razlike. U svrhu usporedbe uzoraka iz ovog i prijašnjeg istraživanja provedene su analize kovarijance, jedna za svaki od pokazatelja psihičkog zdravlja, pri čemu je istraživanje bilo glavna nezavisna varijabla, a psihičko zdravlje zavisna varijabla. Rod, dob i socioekonomski status su statistički kontrolirani. Kako bismo ostvarili slične veličine podgrupa, što je preduvjet za provedbu analize kovarijance, ujednačili smo proporcije sudionika prema rodu tako da smo po slučaju izbrisali podatke za dio žena u uzorku Jokić-Begić i sur. (18), što je metoda koju preporučuju Tabachnik i Fidell (27). Preliminarne analize su pokazale da dob pokazuje homogenost regresije te ju je bilo moguće uključiti u analize kao kovarijatu (28). Međutim, povezanost socioekonomskog statusa i psihičkog zdravlja nije bila podjednaka u svim podgrupama te je stoga nismo mogli uključiti kao kovarijatu. Zbog toga smo sudionike podijelili prema socioekonomskom statusu u tri skupine podjednake veličine i uključili tu varijablu u analize kovarijance kao dodatni nezavisni faktor, na isti način kako smo uključili i rod, u skladu s preporukama Tabachnik i Fidell (27). Dakle, ukratko, provedene su četiri analize kovarijance s četiri pokazatelja psihičkog zdravlja kao zavisnim varijablama, s istraživanjem, rodom i socioekonomskim statusom kao nezavisnim varijablama, i s dobi kao kovarijatom na uzorku od 1426 sudionika [725 iz *geek* uzorka i 701 iz uzorka Jokić-Begić i sur. (18)]. Pretpostavke za provedbe analize kovarijance su uglavnom bile

mer's V = .35) and more participants with a higher socioeconomic status ($\chi^2(5) = 135.5$, p < .001, Cramer's V = .22).There were also statistically significant differences in education attainment ($\chi^2(4) = 27.3$, p < .001, Cramer's V = .08) and relationship status ($\chi^2(2) = 68.7$, p < .001, Cramer's V = .14), but giving the sensitivity of χ^2 test to large samples and small effect size (20,21), they were probably not practically relevant. There were no significant differences in the working status ($\chi^2(4) = 6.2$, p = .188, Cramer's V = .04). In personal correspondence with the authors (18), we obtained the data for secondary analysis in which we tried to control these differences. To compare the samples from the previous and the present study, the analyses of covariance were performed, one for each of the mental health indicators, with study being the main independent factor and mental health being the dependent variable. Gender, age, and socioeconomic status were statistically controlled. In order to achieve similar sample sizes, a prerequisite for analysis of covariance, the gender proportions were equalized in two data sets by random deletion of women in Jokić-Begić et al. (18), a technique recommended by Tabachnik and Fidell (27). Preliminary analyses indicated age showed homogeneity of regression and was therefore included as a covariate (28). However, the relationship of socioeconomic status and mental health indicators was not the same in all of the groups, and therefore the socioeconomic status could not be included as a covariate. We therefore categorized participants in three groups of similar size regarding their socioeconomic status and included it in the analysis of covariance as an additional independent factor together with gender, as recommended by Tabachnik and Fidell (27). To summarize, we performed four analyses of covariance with four mental health indicators as dependent variables; study, gender, and socioeconomic status as independent variables; and age as a covariate on sample of 1426 [725 from our sample, and

zadovoljene: podatci su u određenoj mjeri odstupali od normalne distribucije (na što su ukazivali značajni Shapiro-Wilk testovi), ali ne previše i na sličan način u svim podskupinama (što je bilo vidljivo u Q-Q prikazima); omjer najveće i najmanje varijance u podskupinama je bio manji od 4; i kovarijata i zavisna varijabla su pokazale linearnu povezanost homogenu po podskupinama (29).

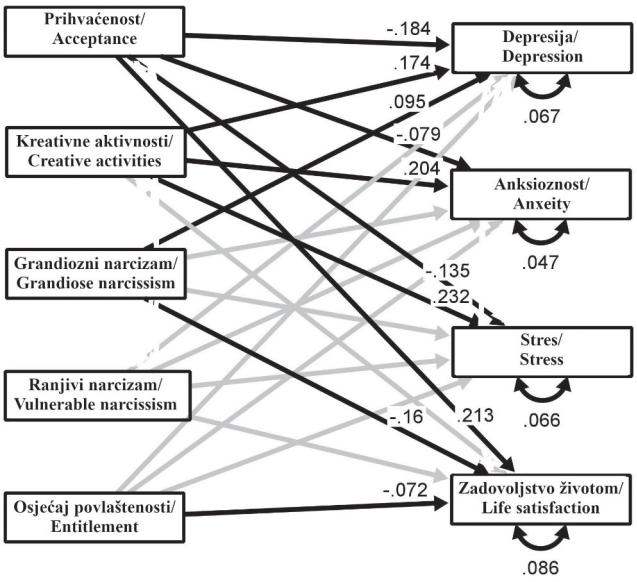
Ove analize kovarijance pokazale su da *geek* uzorak ima jednake razine anksioznosti i stresa kao i uzorak Jokić-Begić i sur. (18), te statistički značajno manje simptoma depresije i više zadovoljstvo životom, iako su veličine učinka (η^2) bile vrlo male (tablica 2). Postojali su i značajni efekti roda, dobi i socioekonomskog statusa za većinu pokazatelja psihičkog zdravlja, no neće biti predstavljeni jer nisu relevantni za ovo istraživanje. Nijedna interakcija nije bila značajna osim interakcije istraživanja i socioekonomskog statusa za depresiju, $F(2, 1405) = 5.7$, $p = .003$, $\eta^2 = .008$. Kod osoba visokog i srednjeg socioekonomskog statusa nije bilo razlika među uzorcima, dok su kod osoba niskog socioekonomskog statusa sudionici iz *geek* uzorka imali manje simptoma depresije nego sudionici iz drugog istraživanja.

Drugi dio cilja istraživanja bio je ispitati odnose motivacija za *geek* aktivnosti i psihičkog zdravlja. U tu svrhu provedena je analiza traga pomoću robusne metode maksimalne vjerojatnosti sa svim informacijama (engl. *ful information maximum likelihood*), koja je bila izabrana zbog odstupanja distribucija od normalnih (Henze-Zirkler test multivarijatnog normaliteta = 1.46, $p < .001$) i postojanja podataka koji nedostaju (30,31). Četiri pokazatelja psihičkog zdravlja bili su zavisne varijable koje su predviđali Prihvaćenost *geek* aktivnosti od drugih ljudi kao pokazatelj potrebe za pripadanjem, Uključenost u kreativne *geek* aktivnosti kao pokazatelj aktivne uključenosti te Grandiozni i Ranjivi narcizam i Osjećaj povlaštenosti kao pokazatelji migracije u izmišljeni svijet (slika 1).

701 from the Jokić-Begić et al. sample (18)]. The assumptions for analysis of covariance were mostly met: the data deviated from normal distribution (as indicated by Shapiro-Wilk test) but not a lot and in a similar way in all groups (as indicated by Q-Q plots); the ratio of largest to smallest variance was smaller than 4; and the covariate and dependent variables had a linear relationship homogenous across groups (29).

These analyses indicated that the geek sample had the same anxiety and stress levels as the one in Jokić-Begić et al. (18), and statistically significantly fewer depression symptoms and higher life satisfaction, although the effect sizes (η^2) were very small (Table 2). There were also significant main effects of gender, age and socioeconomic status for most mental health indicators, but they will not be presented as they are not relevant for this study. No interaction was significant, except that of sample and socioeconomic status for depression, $F(2, 1405) = 5.7$, $p = .003$, $\eta^2 = .008$. For those of high and middle socioeconomic status, there were no differences between the samples, while for those with low socioeconomic status, the geek sample showed fewer depression symptoms than the other sample.

The second part of the objective was exploring the relationships of motivations for geek activities and mental health. A path analysis model was estimated with robust full information maximum likelihood due to the non-normal distributions (Henze-Zirkler test of multivariate normality = 1.46, $p < .001$), and missing data (30,31). Four mental health indicators were dependent variables predicted by Acceptance by others to one's geek activities as an indicator of need for belongingness, Engagement in creative geek activities as an indicator of desire for engagement, and Grandiose and Vulnerable narcissism and Entitlement as indicators of great fantasy migration motivation (Figure 1).



SLIKA 1. Odnosi pokazatelja različitih *geek* motivacija s pokazateljima psihičkog zdravlja (*N* = 1217). Standardizirani značajni putevi prikazani su crnom bojom, a neznačajni *(p* > .05) sivom. Zakrivljene strjelice označuju postotak objašnjene varijance. Kovarijance nisu prikazane zbog jasnijeg prikaza.

FIGURE 1. Relations of indicators of different geek motivations with mental health indicators (*N* = 1217). Standardized significant paths are displayed in black and non-significant paths *(p* > .05) in grey. Curved arrows indicate percent of variance explained. Covariances omitted for clarity.

Prihvaćenost od drugih bila je povezana s manjim brojem simptoma na svim DASS ljestvicama (β od -.08 do -.18) i s višim zadovoljstvom životom, za koje je bila najsnažniji prediktor (β = .21). Uključenost u kreativne aktivnosti bila je najsnažniji prediktor za većinu DASS ljestvica, ali u neočekivanom smjeru: viša uključenost predviđala je više rezultate na DASS ljestvicama (β od .17 do .23). Grandiozni narcizam i Osjećaj povlaštenosti predviđali su zadovoljstvo životom (β = -.16/-.07), a Grandiozni narcizam predviđao je i depresiju (β = .10), dok Ranjivi narcizam nije bio povezan s psihičkim zdravljem.

Acceptance by others was related to fewer symptoms on all DASS scales (β from -.08 to -.18), and to higher life satisfaction, for which it was the strongest predictor (β = .21). Engagement in creative activities was the strongest predictor of most DASS subscale scores, but in an unexpected direction: higher engagement was related to higher DASS scores (β from .17 to .23). Grandiose narcissism and Entitlement predicted life satisfaction (β = -.16/-.07), and Grandiose narcissism predicted depression (β = .10), while Vulnerable narcissism was not related to mental health.

RASPRAVA

Stereotipovi o *geekovima* impliciraju da imaju poteškoća u prilagodbi životnim zahtjevima (2,3,4,9), što bi moglo dovesti do lošeg psihičkog zdravlja, te je to pretpostavka istražena u ovom radu. U svrhu njene provjere razine psihičkog zdravlja *geekova* uspoređene su s psihičkim zdravljem opće populacije te je ispitano može li

DISCUSSION

The stereotypes about geeks imply they have problems adapting to life demands (2,3,4,9), which might lead to mental health issues, an assumption we explored in this study. To test this, the mental health levels of geeks were compared to that of general population, and it was explored if mental health of geeks can

se psihičko zdravlje *geekova* objasniti različitim motivacijama u pozadini *geek* aktivnosti.

Razine psihičkog zdravlja

Podatci o psihičkom zdravlju *geekova* prikupljeni su tijekom pandemije COVID-19 te je zbog toga bilo važno naći uzorak koji je usporediv s obzirom da je pandemija utjecala na psihičko zdravlje (17,32). U sklopu dvaju istraživanja prikupljeni su podatci o psihičkom zdravlju u Hrvatskoj u sličnom razdoblju [svibanj (18) i srpanj 2020 (17)], čime je ostvarena sličnost u fazi pandemije i kulturalnom kontekstu, odnosno u dva faktora za koje je utvrđeno da su važne odrednice psihičkog zdravlja tijekom pandemije (17,32). Ajduković i sur. (17) su koristili probabilističko stratificirano kvotno uzorkovanje kako bi ostvarili nacionalno reprezentativni uzorak prema osnovnim sociodemografskim karakteristikama. U usporedbi s takvim uzorkom, *geekovi* su imali slično ili čak bolje psihičko zdravlje (tablica 2). Za Depresiju i Stres veličina učinka za dobivenu razliku bila je mala, te su aritmetičke sredine u oba uzorka bile 1 (na ljestvici 0-3 mogućih odgovora), odnosno, iako su razlike bile statistički značajne, vjerojatno zbog veličine uzorka, uzorci se čine vrlo slični prema pokazateljima psihološke uznemirenosti. Za zadovoljstvo životom veličina učinka je bila relativno velika (d = 0.75). Međutim, s obzirom da su se uzorci razlikovali prema sociodemografskim karakteristikama, moguće je da su ove razlike u psihičkom zdravlju, a možda čak i nedostatak razlika, rezultat razlika u sociodemografskim karakteristikama, a ne rezultat nekih osobina specifičnih za *geekove*. U uzorku *geekova* bilo je manje pojedinaca s niskim prihodima, što je povezano s višim zadovoljstvom životom tijekom pandemije (33), odnosno zbog toga je zadovoljstvo životom u uzorku *geekova* moglo biti veće. Međutim, u tom je uzorku također bilo i više mlađih sudionika, što je pak povezano s nižim zadovoljstvom životom tijekom pandemije (34,35). Implikacije prijašnjih istraživanja

be explained by different motivations for geek activities.

Mental health levels

The data on mental health of geeks was collected during the COVID-19 pandemic so it was important to find a comparable sample, since the pandemic affected mental health (17,32). Two studies collected the data on mental health in Croatia at a similar point in time (May (18) and July 2020 (17)), thus assuring the comparability of the phase of the pandemic and cultural context, which are both important determinants of mental health in the pandemic (17,32). Ajduković et al. (17) used probabilistic stratified quota sampling as to achieve a nationally representative sample regarding basic sociodemographic characteristics. Compared to such a sample, geeks had the same amount or even less of mental health issues (Table 2). However, for Depression and Stress the effect size was small, and means indicate that both samples on average have an answer 1 (on a 0-3 scale of possible responses). Thus, although statistically significant, probably due to large sample size, the samples could be considered very similar regarding the psychological distress indicators. For life satisfaction the effect size was quite large (d = 0.75). However, since the samples differed in sociodemographic characteristics (Table 1), these differences in mental health, and maybe even the lack of differences, might be better explained by these sociodemographic differences than by some geek-specific characteristics. The geek sample had less individuals with low income, characteristic that is related to higher life satisfaction during the pandemic (33), so this might be the reason why life satisfaction in the geek sample was higher. However, it also had more participants of younger age, which is related to lower life satisfaction during the pandemic (34,35). The implications are inconsistent for psychological distress also: younger age of the geek sample

za zaključivanje o psihološkoj uznemirenosti su također proturječne: mlađa dob u uzorku *geekova* implicira da su možda imali više razine simptoma psihičkih poremećaja, no manje sudionika s osnovnom školom i niskim prihodom implicira da su možda u prosjeku imali manje simptoma. Zbog toga je za valjano zaključivanje o razlikama u psihičkom zdravlju bila potrebna kontrola sociodemografskih karakteristika.

Kontrola razlika u sociodemografskim karakteristikama ostvarena je sekundarnim analizama podataka iz istraživanja Jokić-Begić i sur. (18) zajedno s podatcima prikupljenima u ovom istraživanju *geekova*. Analize koje su uzele ove razlike u obzir upućivale su na slične zaključke – ponovo nisu postojale razlike među uzorcima u anksioznosti, ali ovaj put nisu bile značajne ni razlike u stresu. Za depresiju veličina učinka je ponovo bila vrlo mala (tablica 2), i upućivala je da, iako razlika postoji, u suprotnosti je sa stereotipovima – *geekovi* su imali manje simptoma depresije. Također je ponovo postojala razlika u zadovoljstvu životom pri čemu su *geekovi* imali više zadovoljstvo nego sudionici drugog istraživanja. Međutim, ovaj put je veličina učinka bila vrlo mala ($\eta^2 = .01$), a oba uzorka imala su u prosjeku isti odgovor 7 (na ljestvici 0-10 mogućih odgovora). Na temelju toga možemo zaključiti da je psihičko zdravlje ovog uzorka *geekova* slično onom sudionika istraživanja Jokić-Begić i sur. (18).

Pri generalizaciji sličnosti između uzoraka u istraživanju *geekova* i u istraživanju Jokić-Begić i sur. (18) na sličnost *geekova* i opće populacije treba uzeti u obzir da su oba istraživanja imala prigodne uzorke što može dovesti do pristranosti. Međutim, pozivi za ova dva istraživanja bili su dosta različiti – istraživanje Jokić-Begić i sur. (18) započinjalo je pozivom sudionicima da saznaju kako se nose s pandemijom, a u istraživanju *geekova* poziv je bio upućen onima koji se smatraju *geekovima* da pomognu istraživačima otkriti nešto o *geekovima* u Hrvatskoj. Zbog toga nije vrlo vjerojatno da su uzorci bili pristrani na sličan način, odnosno da su privukli

implies it could have more mental health issues, but less participants with primary education and low income imply it might have less mental health issues. Therefore, the control of sociodemographic characteristics was required in order to enable valid conclusions.

The control of differences in sociodemographic characteristics was achieved by secondary analyses of data used in Jokić-Begić et al. (18) together with the data collected in this study on geeks. This led to similar conclusions – again, there were no differences between samples in anxiety, but this time neither in stress. For depression the effect size was again quite small (Table 2), and indicated that if there is any difference, it is contrary to the stereotypes – geeks had fewer depression symptoms. There was again a difference in life satisfaction, with geeks having higher levels than the other sample. However, this time, the effect size was quite small ($\eta^2 = .01$), with both samples having the same average response 7 on the scale 0-10. Based on this, we can conclude the mental health of this geek sample is similar to that of participants in the study of Jokić-Begić et al. (18).

When generalizing the similarity between this sample of geeks and the sample in Jokić-Begić et al. (18) to similarity between geeks and general population, it should be taken into account that both studies used convenience sampling that might lead to bias. However, the invitations for these two studies were quite different – the research presented in Jokić-Begić et al. (18) begun with an invitation for participants to find out how they cope with the pandemic, and the research on geeks invited those who consider them geeks to help the researchers find out something about geeks in Croatia. Therefore, it does not sound probable that they were biased in the same way in terms of attracting participants of certain levels of mental health. Another methodological issue to take into account when interpreting these

sudionike određenih razina psihičkog zdravlja. Još jedan metodološki aspekt koji je važno uzeti u obzir pri interpretaciji ovih rezultata jest što su ove analize provedene na poduzorku *geekova*. Teško je s velikom točnošću ustvrditi bi li psihičko zdravlje čitavog uzorka bilo različito od tog poduzorka da smo imali sve podatke. Ne znamo je li razlika u dobi (2,5 godine) i manji broj zaposlenih sudionika u poduzorku onih koji nisu uključeni u analize dovoljno da psihičko zdravlje, ako bi se gledao čitav uzorak, bude niže, pogotovo zato jer su proporcije nezaposlenih i sudionika s osnovnom školom, što su oboje izraženiji rizični faktori za psihičko zdravlje tijekom pandemije (34,35), slične u oba poduzorka.

Čini se da *geekovi* nemaju višu psihološku uznemirenost niti niže zadovoljstvo životom nego pojedinci iz opće populacije, odnosno čini se da se ne razlikuju ni na jednoj od dimenzija psihičkog zdravlja pretpostavljenih dvojnim modelom. Prema našim saznanjima, ovo je prvo istraživanje koje je na taj način istraživalo psihičko zdravlje ove skupine. Ako pogledamo definiciju *geeka*, ovo nije toliko iznenađujuće – u nju nije uključena ni jedna osobina koju bi općenito mogli smatrati bilo adaptivnom bilo neadaptivnom (3,4,6,7). Stereotipi koji impliciraju lošu snalažljivost *geekova* u stvarnom životu (2,3,4,9) vjerojatno proizlaze iz povijesnog razvoja izraza *geek*, a ne njihovih karakteristika u današnje vrijeme. Ovaj izraz u početku se koristio za pojedince koji su vrlo inteligentni i snalaze se s tehnologijom, ali se ne snalaze u društvu, uglavnom kao suprotnost „cool" pojedincima koji su bili usredotočeni na fizičke aktivnosti i popularni u društvu (7). Kako je tehnologija postojala sve značajniji dio svakodnevnog života, tako je stručnost u tehnologiji bila sve manje povezana s nižim društvenim statusom (7), što je vjerojatno dovelo do toga da društveni aspekt prestane biti dio definicije *geekova*. Istovremeno, čini se da se definicija proširila u smislu da uključuje i stručnost u drugim područjima osim tehnologije, što se

results is that these analyses were performed on a subsample of geeks. It is hard to ascertain if the mental health of the whole sample would be different from that of the subsample used if we had all the data. We do not know if the age difference (2.5 years) and the smaller number of employed participants (in the sample not included in the analyses) are sufficient to decrease the mental health of the sample as a whole, especially because proportions of those unemployed and with primary school education, as the more pronounced risk factors for mental health during the pandemic (34,35), are similar in both samples.

It seems geeks do not experience more psychological distress nor lower life satisfaction than the general population, i.e., they do not differ in any of the dimensions of mental health suggested by the dual-factor model. To our knowledge, this is the first research to explore the mental health of this group in this way. If we go back to the definition of the geek, this is not surprising – it does not include any characteristic that could be considered either generally adaptive or maladaptive (3,4,6,7). The stereotypes regarding the low functionality of geeks in real life (2,3,4,9) probably stem from the historical evolution of the term, and not their characteristics nowadays. The term *geek* was at first used to describe individuals who are highly intelligent and good with technology, but socially awkward, mostly as a contrast to "cool" individuals focused on physical activities and popular (7). As technology became a bigger part of everyday life, proficiency in using technology was less and less related with lower social status (7), which probably led to the social aspect being dropped from the definition of what a geek is. At the same time, it seems that the definition has widened to include proficiency in other fields besides technology, which is probably related to close relationships of technology and science fiction and the historical development of the science

vjerojatno može objasniti bliskošću tehnologije i znanstvene fantastike i s tim povezanim povijesnim razvojem žanrova znanstvene fantastike i fantastike i *geek* konvencija (9,36).

Psihičko zdravlje i motivacija za *geek* aktivnosti

Pokazano je da, u prosjeku, *geekovi* nemaju lošije psihičko zdravlje. Međutim, to ne znači da ne postoje *geekovi* koji nemaju slabije psihičko zdravlje, bilo da je to manje zadovoljstvo životom, više simptoma psihičkih poremećaja ili oboje. Sljedeće je provjereno postoje li neke karakteristike *geek* aktivnosti koje možemo smatrati rizičnim ili zaštitnim faktorom za psihičko zdravlje, konkretnije, motivacije za *geek* aktivnosti. U skladu s očekivanjima, što su *geekovi* osjećali da su njihove *geek* aktivnosti prihvaćenije, to su osjećali manju uznemirenost i više zadovoljstvo. Ovo bi moglo ukazivati da je njihova potreba za pripadanjem zadovoljena uključivanjem u *geek* aktivnosti (3), što onda dovodi do boljeg psihičkog zdravlja, posebice do većeg zadovoljstva životom. Naša očekivanja su djelomično potvrđena i za narcizam s obzirom da su grandiozni narcizam i osjećaj povlaštenosti bili povezani s višom depresijom i nižim zadovoljstvom životom. Međutim, nisu predviđali anksioznost i stres. Brailovskaia i sur. (37) su već ranije utvrdili da narcizam nedoslijedno korelira s depresijom, anksioznošću i stresom u nekliničkim uzorcima te možda postojanje tih korelacija ovisi o uzorku o kojem je riječ. Rezultati na ovom uzorku *geekova* su u skladu s hipotezom migracije u izmišljeni svijet po kojoj su razlozi za migraciju grandiozna slika o sebi i povlašteni status koji osoba smatra da zaslužuje. Oni također pokazuju da osujećenost potrebe za postignućem u stvarnom svijetu dovodi do sniženog raspoloženja, ali ne nužno i do anksioznosti i stresa, što bi mogao biti pokazatelj osjećaja bespomoćnosti u vezi stvarnog svijeta.

Izraženija uključenost u kreativne aktivnosti neočekivano je bila povezana s višim razinama

fiction and fantasy genre and geek conventions (9,36).

Mental health and motivations for geek activities

We have shown that, on average, geeks do not have worse mental health. However, that does not mean that there are no geeks with mental health issues, whether it is low satisfaction with life, more psychological distress, or both. What we wanted to see next is if there were some aspects of geek activities that could be considered as risk or protective factors for mental health, namely the motivations for geek activities. As expected, the more accepted the geeks feel in their geek activity, the less distress and more life satisfaction they feel. This could indicate that their need for belonging is fulfilled by engagement in geek activities (3), which leads to better mental health, and especially to greater life satisfaction. Our expectations were partly confirmed for narcissism, with grandiose narcissism and entitlement being related to higher depression and lower life satisfaction. However, they were not predictive for anxiety and stress. Brailovskaia et al. (37) found inconsistent relations between narcissism and depression, anxiety, and stress scores in non-clinical samples, so maybe the existence of these relations depends on the sample in question. The results in the geek sample are in accordance with the great fantasy migration hypothesis – the suggested reasons for the migration are the grandiose sense of self and the praise individuals think themselves entitled to. It also indicates that the thwarting of the need for accomplishment in the real world leads to lower mood, but not necessarily a rise in anxiety and stress, which might be indicative of the feeling of helplessness concerning the real world.

Most surprisingly, higher engagement in creative activities was related to higher psycho-

psihološke uznemirenosti. Ako su kreativne aktivnosti pokazatelj aktivne uključenosti, to bi značilo da je psihološka uznemirenost to viša što je želja za aktivnom uključenosti jača. U tom slučaju očekivali bismo da su i drugi konstrukti koji bi trebali biti indikativni za ovu želju, kao što su traženje uzbuđenja, potreba za kognicijom i otvorenost k iskustvu (3), također povezani s psihičkim zdravljem. Prema našim saznanjima, ne postoje podatci o *geekovima*, ali u uzorcima pojedinaca koji nisu *geekovi* povezanosti ovih konstrukata i psihičkog zdravlja variraju od pozitivnih do negativnih, uključujući i neznačajne (38,39,40), što ni podržava ni osporava hipotezu o povezanosti želje za aktivnom uključenosti i psihičkog zdravlja. Također je moguće da kreativne aktivnosti nisu dobar pokazatelj želje za aktivnom uključenosti. Vrstu kreativnosti koja je izmjerena u ovom istraživanju istraživači nazivaju mala-k ili svakodnevna kreativnost (41), i ona u prosjeku ima neznačajnu povezanost s psihopatologijom prema meta-analizi Paek i sur. (42). U toj meta-analizi je također pokazano da povezanost kreativnosti i psihopatologije varira od pozitivne do negativne ovisno o različitim faktorima, uključujući vrstu i stupanj izraženosti psihopatologije te način na koji su psihopatologija i kreativnost mjereni. Autori su pretpostavili da tu heterogenost djelomično mogu objasniti modeli koji pretpostavljaju da je ta povezanost nelinearna pri čemu umjerene razine određenih simptoma odgovaraju najvišim razinama kreativnosti. Ovo bi moglo objasniti i nalaze ovog istraživanja *geekova* s obzirom da psihološka uznemirenost u ovom istraživanju uglavnom varira od uobičajene do umjerene. Također je zanimljivo uzeti u obzir i različite motive u podlozi kreativnosti – to su uživanje, izražavanje, izazov, suočavanje, prosocijalnost, društveni motivi, materijalni motivi, prepoznatost i obaveza, pri čemu je uživanje obično najizraženiji motiv (43). Međutim, ako je sudionicima u ovom istraživanju glavni motiv bio suočavanje, onda bi kreativne aktivnosti mogle biti pokazatelj izloženosti stresu, koji bi onda mogao dovesti do psihološke uznemirenosti.

logical distress. If creative activities are an indicator of the desire for engagement, this would mean that the stronger the desire for engagement, the more psychological distress one experiences. If so, we would expect other constructs that should be indicative of this desire, like sensation seeking, need for cognition, and openness to experience (3), to be related to mental health as well. There are no data on geeks (to my knowledge), but in non-geek samples the correlations of these constructs and mental health varied from positive to negative, including non-significant (38,39,40), which neither supports nor disapproves the relation of the desire for engagement and mental health. It might also be that creative activities are not a good indicator of desire for engagement. The type of creativity measured here is what researchers define as little-c or everyday creativity (41), which on average has a non-significant correlation with psychopathology, as established in the meta-analysis by Paek et al.(42). The same study also established that this correlation of creativity and psychopathology varies from positive to negative, depending on multiple factors, like type and severity of mental illness, and the way psychopathology and creativity are measured. The authors proposed that this heterogeneity could be partly explained by models that suppose that this relationship is non-linear, with moderate levels of certain symptoms corresponding to highest creativity. This might be the case in our sample, given that distress levels in our sample mostly vary from normal to moderate. It is also interesting to take into account the possible motives for creativity - enjoyment, expression, challenge, coping, prosocial, social, material, recognition, and duty - out of which enjoyment is usually the strongest (43). However, if for our participants the motive was coping, then creative activities might also be an indicator of individuals being exposed to stress, which could lead to psychological distress, if the coping is not effective. This is

sti, ako suočavanje nije uspješno. Ovu hipotezu podržava to što je najjača povezanost kreativnih aktivnosti bila upravo sa stresom. Ove hipoteze je potrebno dalje provjeriti. Međutim, čak i ako su točne, nejasno je jesu li *geekovi* koristili kreativne aktivnosti kao metodu suočavanja sa stresorima povezanim s pandemijom u čemu su bili neuspješni zbog pandemije, ili je to njihov uobičajeni (ne)uspješni način suočavanja sa stresom.

Dakle, ako je motivacija za uključenost u *geek* aktivnosti potreba za pripadanjem, *geek* aktivnosti mogu biti zaštitni faktor, pogotovo za zadovoljstvo životom. Međutim, ako je motivacija migracija u izmišljeni svijet, *geek* aktivnosti mogu biti faktor rizika za oba aspekta mentalnog zdravlja. Slično možda vrijedi i za kreativne aktivnosti i aktivnu uključenost, no to nije sasvim razjašnjeno u ovom istraživanju. Količina objašnjene varijance nije bila velika ni za jedan od pokazatelja psihičkog zdravlja, što ukazuje da *geek* aktivnosti doprinose psihičkom zdravlju, ali ne previše. Ovo nije iznenađujuće s obzirom na složenu prirodu psihičkog zdravlja, a pogotovo s obzirom na kontekst pandemije u kojem su prikupljani podatci koji je već sam po sebi imao veliki utjecaj na psihičko zdravlje (17,32).

Također je zanimljivo primijetiti da prihvaćenost najviše doprinosi zadovoljstvu životom, dok kreativne aktivnosti najviše doprinose psihološkoj uznemirenosti, što ukazuje na to da različite motivacije za *geek* aktivnosti različito doprinose različitim aspektima psihičkog zdravlja, odnosno i kvaliteti života i prisutnosti odnosno odsutnosti simptoma psihičkih poremećaja. Naši rezultati tako daju daljnju potporu dvojnom modelu psihičkog zdravlja potvrđujući dvije njegove pretpostavke. S jedne strane potvrđuju da su predložene dimenzije djelomično preklapajuće s obzirom da su neki prediktori zajednički (prihvaćenost i grandiozni narcizam). S druge strane, potvrđuju da se ove dimenzije opravdano razdvajaju s obzirom da su neki prediktori jedinstveni za pojedine dimenzije (kreativne aktivnosti i osjećaj povlaštenosti).

supported by our data that indicate that the strongest relation is with stress. These hypotheses need further verification. However, even if they were true, it is unclear whether geeks used creative activities as a coping mechanism to deal with the pandemic-related stressors and were unsuccessful due to the pandemic, or if they are their usual (un)successful coping mechanism.

Therefore, if the motivation for geek engagement is the need for belongingness, geek activities may be a protective factor, especially regarding life satisfaction. However, if the motivation is the migration into the fantasy world, geek activities can be a risk factor for both aspects of mental health. Similar might be valid for creative activities and desire for engagement, but this remained unclear in our data. The amount of variance explained was not large for any of the mental health indicators, indicating that geek activities contribute to mental health, but not strongly. This is not surprising, given the complexity of mental health, and even more so given the pandemic context that itself had a great influence on mental health (17,32).

It is also interesting to note that acceptance contributes most strongly to life satisfaction, while creative activities contribute most to psychological distress, indicating that different motivations for geek activities contribute to different aspect of mental health, i.e., both to quality of life and (absence of) mental illness symptoms. Our results thus support the dual-factor model of mental health by endorsing two of its assumptions. First, the existence of common predictors (acceptance and grandiose narcissism supports the assumption that the suggested dimensions of mental health partly overlap. On the other hand, the existence of predictors unique for each of the dimensions (creative activities and entitlement, Figure 1) support the assumption that these mental health dimensions are separate constructs.

Ograničenja i implikacije

S obzirom na specifični kontekst pandemije moguće je da je općeprisutno pogoršanje psihičkog zdravlja (35) prikrilo razlike koje inače postoje između *geekova* i ostalih. Međutim, to bi bilo proturječno nalazima istraživanja koji pokazuju da je kod osoba kod kojih je psihičko zdravlje bilo lošije prije pandemije povećana vjerojatnost daljnjeg pogoršanja psihičkog zdravlja zbog pandemije (33). U tom slučaju ne bismo očekivali da razlike nestanu već da postanu još izraženije. Neke od tipičnih *geek* aktivnosti bile su dostupne tijekom pandemije, kao što su računalne igre, te je prilika da se tijekom pandemije u većoj mjeri bave njima važnim aktivnostima kod dijela *geekova* mogla dovesti do viših razina mentalnog zdravlja u obliku povećanja kvalitete života, ili djelovati kao zaštitni faktor te umanjiti psihološku uznemirenost. No u nekim od *geek* aktivnosti, kao što su društvene igre i igre igranja uloga (RPG), *geekovi* su bili spriječeni sudjelovati. Moguće je da zbog toga nije došlo do razlikovanja od opće populacije, u kojoj su vjerojatno također postojali pojedinci kojima su aktivnosti koje su mogle doprinijeti psihičkom zdravlju bile dostupne, kao i oni kojima nisu bile dostupne. No također je moguće da je mogućnost bavljenja željenim interesima kod *geekova* prikrila razliku koja inače postoji između geekova i opće populacije. Stoga bi ipak zaključke ovog istraživanja o sličnosti trebalo provjeriti izvan konteksta pandemije te uzeti u obzir tip aktivnosti. Iako naše istraživanje ukazuje da *geekovi* nisu skloniji psihološkoj uznemirenosti, naši zaključci su ograničeni izborom mjera simptoma psihičkih poremećaja. S obzirom na uobičajene stereotipe o *geekovima* možda bi trebalo detaljnije istražiti socijalnu anksioznost kao mogući izvor razlika u psihičkom zdravlju između *geekova* i opće populacije, što bi svakako trebalo detaljnije istražiti. Međutim, s obzirom na visoki komorbiditet socijalne anksioznosti s depresijom i anksioznošću (44), očekivali bismo da u slučaju da je socijalna

Limitations and implications

Because of the specific context of the pandemic, there is a possibility that the general degradation in mental health (35) has hidden the usually existing differences between geeks and others. However, this would be in contradiction with the research indicating that those with previous mental health problems are at a special risk for mental health issues because of the pandemic (33). In that case, we would not expect the difference to disappear, but maybe even get larger. Some of the typical geek activities were available during the pandemic, such as computer games, so maybe the pandemic enabled some of the participants to engage in activities they find important more than usual, thus leading to greater quality of life and higher positive mental health during the pandemic or acting as a protective factor and lowering psychological distress. On the other hand, some of the geek activities, like board games and role-playing games (RPG), were not available due to the pandemic. This might have led to the similarity between the geeks and the general population, since the general population also probably included individuals to whom the activities that they find beneficial to their mental health were available during the pandemic, and individuals to whom they were not available. However, it is also possible that the possibility of geeks to engage in preferred activities decreased the otherwise existing difference in mental health between geeks and general population to non-significant. Therefore, the presented conclusions on the similarity should be tested outside the context of the pandemic while taking into account the type of activity. While our research indicates geeks are not more prone to psychological distress, our data is limited by the choice of measures of psychological distress. Given the stereotypes regarding geeks, maybe social anxiety would be another candidate for discerning geeks from general population in

anksioznost stvarno češća kod *geekova*, razlike u odnosu na opću populaciju dobijemo već u mjerama korištenim u ovom istraživanju.

U ovom istraživanju kao pokazatelj svake od predloženih motivacija za *geek* aktivnosti korišten je jedan konstrukt. U budućim istraživanjima bilo bi korisno provjeriti konvergiraju li mjere različitih konstrukata, pogotovo uzevši u obzir da su ove hipoteze o *geek* motivaciji relativno nove i ne previše provjerene (3). Ovo istraživanje pokazuje da je to posebno bitno za aktivnu uključenost s obzirom da je jedno od mogućih objašnjenja neočekivanih rezultata u vezi kreativnih aktivnosti to da one nisu dobar pokazatelj želje za aktivnom uključenosti. Naši zaključci su osim toga ograničeni i niskom pouzdanošću nekih od ovih pokazatelja, odnosno u budućim istraživanjima bilo bi dobro koristiti druge mjere s boljim psihometrijskim karakteristikama.

Ovo istraživanje pokazuje da pojedinci koji se intenzivno bave izmišljenim svjetovima i drugim interesima vezanim za pop kulturu nemaju nužno više simptoma psihičkih poremećaja ili manje zadovoljstvo životom. Stoga, pri komunikaciji s takvim pojedincima, bilo u profesionalnom ili svakodnevnom okruženju, treba biti osjetljiv na vlastite pristranosti koje bi mogle biti rezultat stereotipa. Ako smo pak u prilici pomoći *geekovima* koji traže pomoć u vezi svog psihičkog zdravlja, raspitivanje o njihovim *geek* aktivnostima može biti korisno pri pružanju podrške (45). Ako se želimo usmjeriti na poboljšanje kvalitete života možemo im predložiti da potraže druge pojedince sa sličnim interesima koji bi ih prihvatili čime bismo ih potaknuli na zadovoljenje potrebe za pripadanjem. Međutim, ako postoje naznake grandiozne slike o sebi ili osjećaja povlaštenosti ili neki drugi pokazatelj da su *geek* aktivnosti neki oblik eskapizma, takve pojedince bilo bi dobro potaknuti na suočavanje s problemima u stvarnom svijetu. Njihov interes za izmišljene svjetove može pomoći pri ostvarivanju kontakta i suočavanju

terms of mental health. This should be further explored. However, given the high comorbidity of social anxiety with depression and anxiety (44), if social anxiety had a higher prevalence among geeks, we would expect some differences even in the measures of psychological distress we used.

In this study, each of the suggested motivations for geek activities was indicated by only one construct. Future research would profit in testing the convergence of multiple indicators, especially given the novelty of these hypotheses of geek motivation (3). Our study indicates this issue is particularly relevant for the desire for engagement, since one of the reasons for unexpected findings regarding creative activities could be that they are not a good indicator of desire for engagement. Our conclusions are further limited by low reliability of some of these indicators, so other measures with better psychometric qualities are needed in future research.

This study has shown that individuals who are heavily invested in invented words and other pop culture related interests do not necessarily have more mental health issues or lower life satisfaction. Therefore, when interacting with them, either professionally or personally, one should be careful not to be biased by the stereotypes. However, if one encounters a geek seeking support regarding their mental health, further inquiry about their geek activities might be informative in assisting them (45). In order to strengthen the quality of life, finding others with similar interests who would accept them could be suggested, thus helping them satisfy their need for belongingness. However, if there are symptoms of grandiose sense of self or entitlement, or other indicators that geek activities might be a form of escapism, they should be supported in coping with problems outside the fantasy world. Their interest in the invented worlds might be used to help them deal with real-life issues and they might be prone to ac-

s izazovima stvarnog svijeta te bi možda bili skloni prihvatiti terapijske pristupe kao što su superherojska ili *geek* terapija (46,47,48).

ZAKLJUČCI

Ovo istraživanje pokazalo je da *geekovi* u usporedbi s općom populacijom imaju jednake ili nešto niže razine psihološke uznemirenosti i jednako ili nešto više zadovoljstvo životom. Psihološka uznemirenost geekova je niža, a zadovoljstvo životom više, ako imaju osjećaj da bliske osobe prihvaćaju njihove *geek* aktivnosti i ako imaju niže razine grandioznog narcizma i osjećaja povlaštenosti, a psihološka uznemirenost je viša, ako su više uključeni u kreativne *geek* aktivnosti. Ovo implicira da je potreba za pripadanjem kao motivacija za *geek* aktivnosti zaštitni faktor, a da je migracija u izmišljeni svijet kao motivacija za *geek* aktivnosti faktor rizika za psihičko zdravlje.

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cepting therapeutical approaches like superhero or geek therapy (46,47,48).

CONCLUSION

This study indicates that geeks, compared to the general population, have the same or slightly lower levels of psychological distress and the same or slightly higher life satisfaction. Psychological distress of geeks is lower and life satisfaction higher if they feel those close to them accept their geek activities and if they have lower levels of grandiose narcissism and entitlement, and psychological distress higher if they engage in more creative geek activities. This implies that the need for belongingness as a motivation for geek activities is a protective factor and that the migration to the fantasy world as a motivation for geek activities is a risk factor for mental health.

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LITERATURA / *REFERENCES*

1. McCarthy K. Remember Things: Consumerism, Nostalgia, and Geek Culture in Stranger Things. J Pop Cult 2019; 52: 663-77. https://doi.org/10.1111/jpcu.12800
2. Tocci J. Geek cultures: Media and identity in the digital age [Doctoral dissertation]. University of Pennsylvania, 2009.
3. McCain J, Gentile B, Campbell WK. A Psychological Exploration of Engagement in Geek Culture. PLoS One 2015; 10: e0142200. https://doi.org/10.1371/ journal.pone.0142200
4. Salter A, Blodgett B. Toxic geek masculinity in media: Sexism, trolling, and identity policing. Cham: Springer, 2017.
5. Woo B. Getting a Life: The Social Worlds of Geek Culture. Montreal: McGill-Queen's Press, 2018.
6. Sugarbaker M. What is a geek? GAZEBO (the journal of geek culture) 1998. Accessed on July22nd 2022 from: http://www.gibberish.com/gazebo/articles/geek3.html
7. Lane KE. How Was the Nerd or Geek Born? In: Lane KE (ed.) Age of the Geek. Cham: Palgrave Macmillan, 2018.
8. Mikac U, Palanović A, Uzelac E (eds). O geekovima u Hrvatskoj. Zagreb: FF Press, in press.
9. Cohen EL, Atwell Seate A, Anderson SM, Tindage MF. Sport fans and Sci-Fi fanatics: The social stigma of popular media fandom. Psychol Pop Media Cult 2017; 6: 193-207. https://doi.org/10.1037/ppm0000095
10. Busse V. An exploration of motivation and self-beliefs of first year students of German. System 2013; 41: 379-98. https://doi.org/10.1016/j.system.2013.03.007
11. Andrews TW, McCann SJ. The relation of geek culture engagement to narcissism and self-esteem: Potential roles of admiration, rivalry, status, and inclusion. Curr Psychol 2020; 41(4): 1921-1935. https://doi.org/10.1007/s12144-020-00697-1

12. Tajfel H, Turner JC. The Social Identity Theory of Intergroup Behavior. In: Jost JT, Sidanius J (eds.) Political Psychology. New York: Psychology Press, 2004.
13. Leary MR, Tambor ES, Terdal SK, Downs DL. Self-esteem as an interpersonal monitor: the sociometer hypothesis. J Pers Soc Psychol 1995; 68: 518-530. https://doi.org/10.1037/0022-3514.68.3.518
14. Woo B. Alpha nerds: Cultural intermediaries in a subcultural scene. Eur J Cult Stud 2012; 15: 659–676. https://doi.org/10.1177/1367549412445758
15. Ryan RM, Deci EL. Self-Determination Theory. New York: Guilford Press, 2017.
16. Iasiello M, Van Agteren J. Mental health and/or mental illness: A scoping review of the evidence and implications of the dual-continua model of mental health. Evidence Base 2020; 1: 1-45. https://doi.org/10.21307/eb-2020-001
17. Ajduković D, Rezo Bagarić I, Bakić H, SA, Frančišković T, Ajduković M. Mental health status and risk factors during Covid-19 pandemic in the Croatia's adult population. Eur J Psychotraumatol 2021; 12(1): 1984050. https://doi.org/10.1080/20008198.2021.1984050
18. Jokić-Begić N, Hromatko I, Jurin T, Kamenov Ž, Keresteš G, Kuterovac-Jagodić G *et al*. Kako smo? Život u Hrvatskoj u doba korone: Preliminarni rezultati istraživačkog projekta. Department of Psychology of Faculty of Humanities and Social Sciences Zagreb, 2020.
19. Newman DA. Missing data: Five practical guidelines. Organ Res Methods 2014; 17: 372–411. https://doi.org/10.1177/1094428114548590
20. Cohen J. Statistical power and analysis for the behavioral sciences. 2nd ed. New York: Lawrence Erlbaum Associates, 1988.
21. Kim HY. Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. Restor Dent Endod 2017; 42(2): 152-155. https://doi.org/10.5395/rde.2017.42.2.152
22. Lin M, Lucas Jr HC, Shmueli G. Research Commentary—Too Big to Fail: Large Samples and the p-Value Problem. Inf Syst Res 2013; 24(4): 906-917. https://doi.org/10.1287/isre.2013.0480
23. Ames DR, Rose P, Anderson CP. The NPI-16 as a short measure of narcissism. J Res Pers 2006; 40: 440-450. https://doi.org/10.1016/j.jrp.2005.03.002
24. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther 1995; 33: 335–343. https://doi.org/10.1016/0005-7967(94)00075-u
25. Reić Ercegovac I, Penezić Z. Zadovoljstvo životom, depresivnost i stres kod žena tijekom trudnoće i prve godine postpartalno-uloga osobina ličnosti, zadovoljstva brakom i socijalne podrške. Klin psihol 2011; 4: 5-21.
26. Lauri Korajlija A, Mihaljević I, Jokić-Begić N. Single-Item Life Satisfaction Measurement. Soc psihijat 2019; 47: 449-469. https://doi.org/10.24869/spsih.2019.449
27. Tabachnick BG, Fidell LS. Using Multivariate Statistics. 5th ed. Boston etc.: Pearson Education, 2007.
28. Huitema BE. The Analysis of Covariance and Alternatives. 2nd ed. New Jersey: John Wiley & Sons, 2011.
29. Howell DC. Statistical Methods for Psychology. 7th ed. Wadsworth: Cengage Learning, 2010.
30. Lai K. Estimating Standardized SEM Parameters Given Nonnormal Data and Incorrect Model: Methods and Comparison. Struct Equ Modeling 2018; 25(4): 600-20. https://doi.org/10.1080/10705511.2017.1392248
31. Jia F, Wu W. Evaluating methods for handling missing ordinal data in structural equation modeling. Behav Res Methods 2019; 51: 2337-55. https://doi.org/10.3758/s13428-018-1187-4
32. Kola L, Kohrt BA, Acharya , Mutamba BB, Kieling C, Kumar M, et al. The path to global equity in mental health care in the context of COVID-19. Lancet 2021; 398: 1670-72. https://doi.org/
33. Geprägs A, Bürgin D, Fegert JM, Brähler E, Clemens V. The Impact of Mental Health and Sociodemographic Characteristics on Quality of Life and Life Satisfaction during the Second Year of the COVID-19 Pandemic—Results of a Population-Based Survey in Germany. Int J Environ Res Public Health 2022; 19: 8734. https://doi.org/10.1016/s0140-6736(21)02233-9
34. Kapović I, Uzelac E, Dumančić F, Čorkalo Biruški D. We Are (Not) in the Same Boat: Sociodemographic Differences in Mental and Social Health during the First Year of Coronavirus Pandemic. Psihologijske teme 2022; 31: 27-57. https://doi.org/10.31820/pt.31.1.2
35. Pieh C, Budimir S, Probst T. The effect of age, gender, income, work, physical activity, and relationship status on mental health during coronavirus disease (COVID-19) lockdown in Austria. J Psychosom Res 2020; 136: 110186. https://doi.org/10.1016/j.jpsychores.2020.110186
36. Vertesi J. "All these worlds are yours except…": Science Fiction and Folk Fictions at NASA. Engag Sci Technol Soc 2019; 5: 135-59. https://doi.org/10.17351/ests2019.315
37. Brailovskaia J, Bierhoff HW, Margraf J. How to identify narcissism with 13 items? Validation of the German Narcissistic Personality Inventory–13 (G-NPI-13). Assessment 2019; 26(4): 630-44. https://doi.org/10.1177/1073191117740625
38. Carton S, Jouvent R, Bungener C, Widlöcher D. Sensation seeking and depressive mood. Pers Individ Dif 1992; 13: 843-9. https://doi.org/10.1016/0191-8869(92)90059-X
39. Zerna J, Strobel A, Strobel A. The role of Need for Cognition in wellbeing – A review of associations and potential underlying mechanisms. PsyArXiv 2021. Accessed on June 22nd 2022 from: https://psyarxiv.com/p6gwh/
40. Carrillo JM, Rojo N, Sánchez-Bernardos ML, Avia MD. Openness to experience and depression. Eur J Psychol Assess 2001; 17: 130. https://doi.org/10.1027//1015-5759.17.2.130
41. Kaufman JC, Beghetto RA. Beyond big and little: The four c model of creativity. Rev Gen Psychol 2009; 13: 1-12. https://doi.org/10.1037/a001368

42. Paek SH, Abdulla AM, Cramond B. A meta-analysis of the relationship between three common psychopathologies—ADHD, anxiety, and depression—and indicators of little-c creativity. Gift Child Q 2016; 60: 117-133. https://doi.org/10.1177/0016986216630600
43. Benedek M, Bruckdorfer R, Jauk E. Motives for creativity: Exploring the what and why of everyday creativity.J Creat Behav 2020; 54: 610-25. https://doi.org/10.1002/jocb.396
44. Koyuncu A, İnce E, Ertekin E, Tükel R. Comorbidity in social anxiety disorder: diagnostic and therapeutic challenges. Drugs Context 2019; 8: 1-13. https://doi.org/10.7573/dic.212573
45. Peeples D, Yen J, Weigle P. Geeks, fandoms, and social engagement. Child Adolescensc Psychiatr Clin 2018; 27(2): 247-67. https://doi.org/10.1016/j.chc.2017.11.008
46. Scarlet J. Superhero therapy: A hero's journey through acceptance and commitment therapy. London: Constable & Robinson, 2016.
47. Sawyer SAH. Integrating Geek Culture Into Therapeutic Practice: The Clinician's Guide to Geek Therapy. London: Leyline Publishing, 2020.
48. Rubin LC (ed.). Using superheroes and villains in counseling and play therapy: A guide for mental health professionals. New York: Routledge, 2019.