Self-protective Behaviour Among Young Adults During Public Health Crisis

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Purpose:

The purpose of this article is to examine perceptions of factors deriving from the theory of planned behaviour among younger adults in times of public health crisis, their self-protective behaviour compared to other age groups, and test the predictive factors according to the theory of planned behaviour.

Design/Methods/Approach:

An online survey has been conducted to examine self-protective behaviour in times of public health crisis. The survey was distributed to Slovenian citizens (n = 280) using the social network Facebook. Descriptive statistics were used to describe the sample and measured variables. Multiple regression analysis was conducted to determine associations between identified factors.

Findings:

The results of the study indicate that there are no significant differences in self-reported self-protection between younger adults and others. Additionally, attitude toward self-protective measures is the most important predictor of self-protective behaviour for both age groups. Only the attitude is significantly associated with self-protective behaviour among young adults, whereas among others, all three predictors are significantly associated with self-protective behaviour, explaining nearly twice the variance.

Research Limitations/Implications:

This research contributes to the understanding of motivators that drive individuals to engage in self-protective behaviour in times of health crises. It provides insight into young adults' self-protective behaviour. Most of the limitations are related to the sample, which only contains respondents from one social network and one country.

Originality/Value:

To the best of our knowledge, this is the first study that explored the self-protective behaviour of young adults during COVID-19 using the theory of planned behaviour and compares the differences in self-protective behaviour predictors among different age groups.

Keywords: COVID-19, theory of planned behaviour, young adults, self-protection

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Samozaščitno vedenje med mladostniki v času javne zdravstvene krize

Namen prispevka:

Namen prispevka je preučiti zaznave mladostnikov v času javne zdravstvene krize skladno z dejavniki teorije načrtovanega vedenja, njihovo samozaščitno vedenje v primerjavi z ostalimi starostnimi skupinami ter preučiti vpliv dejavnikov teorije načrtovanega vedenja na samozaščitno delovanje.

Metode:

Izvedli smo empirično raziskavo v obliki spletnega vprašalnika. Spletni vprašalnik smo s pomočjo družbenega omrežja Facebook razdelili med slovenske državljane (n = 280). Vzorec ter spremenljivke smo opisali s pomočjo opisne statistike. Povezave med dejavniki smo ugotavljali s pomočjo večkratne regresijske analize.

Ugotovitve:

Rezultati raziskave kažejo na to, da med starostnimi skupinami ni statističnih razlik v samoporočanem samozaščitnem delovanju. Odnos do zaščitnih ukrepov se je izkazal za najpomembnejši dejavnik pri napovedovanju samozaščitnega delovanja med obema starostnima skupinama. Med mladostniki je odnos do zaščitnih ukrepov edini statistično značilen napovedni dejavnik, medtem ko so med ostalimi starostnimi skupinami statistično značilni vsi napovedni dejavniki teorije načrtovanega vedenja.

Omejitve/uporabnost raziskave:

Raziskava prispeva k razumevanju motivacijskih dejavnikov, ki vplivajo na samozaščitno delovanje v času zdravstvene krize. Ta raziskava poda uvid v samozaščitno vedenje mladostnikov. Večina omejitev raziskave se nanaša na vzorec, saj smo odgovore zbirali zgolj med uporabniki enega družbenega omrežja in državljani ene države.

Izvirnost/pomembnost prispevka:

Gre za prvo raziskavo, ki preučuje samozaščitno delovanje mladostnikov v času pandemije COVID-19 z uporabo teorije načrtovanega delovanja in primerja razlike v pomembnosti napovednih dejavnikov za samozaščitno delovanje med posameznimi starostnimi skupinami.

Ključne besede: COVID-19, teorija načrtovanega vedenja, mladostniki, samozaščita

1   INTRODUCTION

On the 21st of January first COVID-19 case was detected in Europe. Since then, a number of infections in Europe had grown to a point, when in the middle of March, WHO declared Europe as the new epicenter of the virus (Fredericks,

2020). In response, European countries started adopting protective measures to limit virus transmission (Meier et al., 2020). The majority of protective measures in European countries were adopted from measures recommended by WHO, such as mandatory facemask wearing, social distancing, and self-isolating (WHO, 2020). However, the majority of those protective measures depend on individuals to follow them (Machida et al., 2020), even though states' agencies were controlling them and issuing fines when the violations were detected. To ensure adequate compliance with recommended protective measures during COVID-19 pandemic, it is essential to understand what drives individuals to comply with protective measures (West et al., 2020). This especially applies to groups of people who are crucial for preventing the transmission of the virus, such as young adults (Yu, 2020).

Self-protective behavior during health crises has already been widely researched. Several theories have been explored in connection with self-protective behavior such as the health belief model (Durham et al., 2012), protection motivation theory (Williams et al., 2015), and theory of planned behavior (Liao et al., 2010). Together with the older population, young adults, primarily college students, represent the most frequent sample in these studies (Chan et al., 2015; Yang, 2015). Even though the theory of planned behavior is one of the most used approaches to explain human behavior and was readily used for predicting behavior in health crises in the past, to the best of our knowledge, there is no study that would explore predictors of self-protection derived from the theory of planned behavior, among young adults in times of COVID-19. Since young adults (ages up to 30 years) is a crucial age group for preventing virus transmission (Yu, 2020), it is important to understand what drives their compliance with protective measures. The focus of our research is to examine perceptions of young adults in times of the COVID-19 epidemic, their self-protective behavior, and test the predictive factors according to the theory of planned behavior. Accordingly, we will answer the following research questions.

RQ1: Are there differences in perceptions of factors deriving from the theory of planned behavior between young adults and other respondents (31 years of age and older) in times of COVID-19?

RQ2: Which factors predict self-protective behavior among young adults according to the theory of planned behavior in times of COVID-19 and how the results compare with other respondents?

We will answer the research questions by conducting an online survey among Slovenian citizens, which will offer an insight into the self-protective behavior of Slovenian citizens during the first wave of the COVID-19 pandemic. Additionally, we will be able to determine factors, which predict young adults' self-protective behavior using the theory of planned behavior.

2 THEORETICAL BACKGROUND

COVID-19 pandemic is not the first global pandemic in the last several decades. However, it is one of the first one in which we lack the vaccine to fight it (Schwarzinger et al., 2010; Zhang et al., 2019). This is why self-protective

measures, such as social distancing, self-isolating, and facemask wearing, are most often advocated as efficient measures to stop the spreading of the virus (WHO, 2020). However, efficiency of those measures is highly dependent on will of the individuals to comply with above stated measures (Machida et al., 2020).

2.1 Young Adults in Times of Pandemic

Even though they are less likely to develop severe symptoms of COVID-19 disease (Bonanad et al., 2020), young adults are a crucial age group for preventing the spread of the virus, since they represent the majority of all infection cases (Yu, 2020). The reasons for that may be sought in the largest social circle of all age groups (Yu, 2020), living in areas with denser population (Yang, 2015), and lively social life (Goldstein & Lipsitch, 2020). Previous research, however, has shown that young adults may not be as willing to follow the recommended protective measures as individuals from other age groups (Barr et al., 2008; Qeadan et al., 2020; Szabo et al., 2020; Teasdale et al., 2012). This may be due to the fact that young adults do not feel as threatened by the disease as older population (Szabo et al., 2020; Williams et al., 2012). They also show lower levels of trust towards important actors (such as media, government and health care professionals) compared to other age groups (Freimuth et al., 2014), and feel frustrated with restrictive nature of recommended protective measures (Teasdale et al., 2012). Nevertheless, young adults tend to be well informed on COVID-19 disease, with social networks being their primary medium of information (Abdelhafiz et al., 2020; Mubeen et al., 2020). However, social networks can also be a source of misinformation, which can lead to misleading perceptions on disease among their users (Abdelhafiz et al., 2020). Even though young adults are usually well informed on pandemic diseases, responsible actors fail to effectively communicate the importance of protective measures to young adults, which leads to ignoring recommended protective measures (Yang, 2015).

2.2 Theory of Planned Behavior

The theory of planned behavior (Figure 1) is one of the most used approaches to explain human behavior during pandemic situations. It postulates that attitude, subjective norms, and perceived behavioral control determine behavioral intentions and subsequently, behavior (Ajzen, 1985). Attitude is defined as an individual's overall assessment of the intended behavior that is formed based on their evaluations, and perceived outcomes. Subjective norms are an individual's perception of significant others' beliefs or socially imposed normative pressure that leads individuals to act (Ajzen, 1991). Ajzen (1991) also points out, that behavioral intention can only find expression in behavior if the behavior in question is under volitional control. Volatility in theory of planned behavior is expressed through perceived behavioral control, which is by some researchers replaced with self-efficacy (Bandura, 1998). In research papers that concern public health, however, classic theory of planned behavior explains more variance than versions which use self-efficacy (Liao et al., 2010).
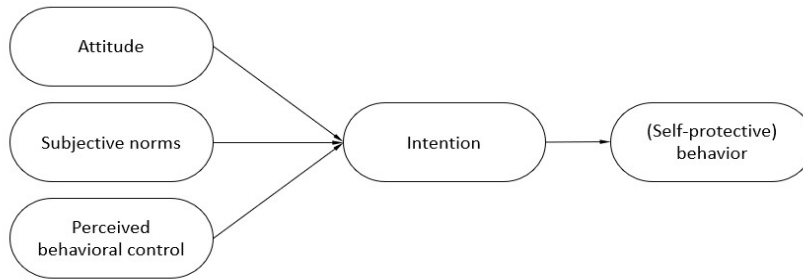
Use of theory of planned behavior in public health research is sensible, as it is applicable on various research fields and it also enables addition of new dimensions (Miller et al., 2012). In research of health-related behavior this theory is often combined with protection motivation theory (Miller et al., 2012; Prasetyo et al., 2020), theory of reasoned action (Ahmad et al., 2020; Liao et al., 2010) and health belief model (Bae & Chang, 2020; Masser et al., 2011; Yang, 2015).

Factor that is the most important for predicting health related behavior with theory of planned behavior appear to be attitude towards behavior (Bae & Chang, 2020; Masser et al., 2011; Zhang et al., 2020a; Zhang et al. 2020b). Miller et al. (2012) conducted a study where they tested if factors from theory of planned behavior predict individuals intention to wash hands in pandemic situation. Subjective norms perceived behavioral control and attitude were all found significant, with latter explaining the most variance. Similar studies were conducted in order to determine if factors from theory of planned behavior predict intention to self-isolate and consuming poultry during H7N9 pandemic (Zhang et al., 2020a; Zhang et al., 2020b). Authors confirmed that all three factors associated with theory of planned behavior are significant predictors of measured behavior. Attitude again proved to be the most important factor for predicting behavior; however, perceived behavioral control explained almost as much variance as attitude.

The theory of planned behavior has already been used to predict health related behavior during COVID-19 pandemic. Bae and Chang (2020) used this theory to predict behavioral intention towards travelling. Results show attitude as the strongest predictor, with subjective norms and perceived behavioral control both also being significant. This is supported by another study conducted (Han et al., 2020) to explore individual's intention to travel during COVID-19 crisis, which showed that attitude is the most important predictor, followed by subjective norms and perceived behavioral control. Additionally, the theory of planned behavior was also used to explore individuals' intentions to use COVID-19 tracking app in Fiji where authors concluded that attitude is the strongest predictor of COVID-19 tracking app use (Sharma et al., 2020).

3   METHOD

To investigate self-protective behavior during the COVID-19 epidemic among young adults, we conducted an online survey. The survey was conducted on

social network Facebook in time when the most restrictive measures were in force (e.g., ban on social gatherings, restrictions on movement between municipalities). The process of questionnaire development and data gathering is presented in the following.

3.1 Questionnaire Development

To ensure the validity and reliability of the results, the research model's indicators were adopted from previously tested questionnaires (Cho & Lee, 2015; Myers & Goodwin, 2011; Zhang et al., 2019). Indicators were then adapted to the research context of self-protective behavior during public health crisis. Constructs were measured with three indicators on a five-point Likert-type scale, except the attitude, which was measured with seven indicators on a five-point semantic differential scale. Subjective norms and perceived behavioral control were adapted from Myers and Goodwin (2011) and Cho & Lee (2015). Attitude was adapted from Zhang et al. (2019), while self-reported protective behavior was self-developed due to the specific circumstances of the pandemic. Indicators were first adapted in the English language. Second, indicators were translated to the Slovenian language by three independent unprofessional translators. While forming the final questionnaire, all three translations were carefully considered. Third, a questionnaire in Slovenian language was evaluated by four respondents that commented on indicators for their understandability.

3.2 Data Collection

The research model was empirically tested with an online survey. The survey was distributed among different groups on Facebook (e.g., student groups, COVID-19 related groups, various interest groups). The survey was active from April 27 to May 12, 2020. In total, 280 respondents completed the survey. Due to more than two-thirds of missing values, two respondents were excluded from future analysis. The final dataset had 4.05 percent of missing values (it ranged from 0.72 percent to 9.45 for individual indicators).

To obtain valid answers and ensure the anonymity of respondents, we considered the following safeguards. First, the questionnaire was distributed in a web application that allowed non-storage of the IP addresses. Second, respondents were informed about the anonymity and voluntariness of participation. Third, we ensured that the data would be processed and stored exclusively for research purposes. Due to the topic's sensitivity, we obtained consent from the University of Maribor Faculty of Criminal Justice and Security Ethics Commission. The Commission issued a positive opinion on the survey on April 9, 2020.

	Variable	N	Percent	Table 1: Sample description
	Primary school	4	1.4	
	High school	119	42.8	
Education	Bachelor's degree	103	37.1	
	Master's degree	36	12.9	
	Doctoral degree	2	0.7	
	Pupil, Student	88	31.7	
Status	Employed, Self-employed	157	56,5	
	Unemployed	15	5,3	
	Retired	9	3,2	
	Rural area	89	32.0	
Settlement	Small town	60	21.6	
	Suburb near large city	38	13.7	
	Large city	88	31.7	

Sample consisted of 77.2 percent female respondents. Age of the respondents ranged from 16 to 71 years. Mean age was 32.9 (SD = 12.1, Me = 29). The remaining demographic data are presented in Table 1.

4   RESULTS

This section presents the results of the study. Statistical analyses were conducted with IBM Statistics SPSS v26.

4.1 Instrument Validation

Since items were aggregated into constructs by calculating their mean values, we fist tested the data for normality of distribution. Since values of skewness and kurtosis ranged from -1.568 to 0.690 and from -0.759 to 2.578 respectively, we assumed that data is normally distributed. Exploratory factor analysis *Principal Axis Factoring* with oblique rotation *Direct Oblimin* confirmed that indicators formed expected factors. The value of *Keiser-Meyer-Olkin* measure of sampling adequacy was 0.877, while Bartlett's test of sphericity was statistically significant ($p < 0.001$). Pattern matrix is presented in Table 2.

Table 2:
Pattern matrix
(Principal
axis factoring
with oblique
rotation)

	1	2	3	4
Attitude_6	0.817	-	-	-
Attitude_5	0.789	-	-	-
Attitude_3	0.787	-	-	-
Attitude_7	0.735	-	-	-
Attitude_4	0.724	-	-	-
Attitude_2	0.652	-	-	-
Attitude_1	0.615	-	-	-
Perceived behavioral control_1	-	0.844	-	-
Perceived behavioral control_2	-	0.770	-	-
Perceived behavioral control_3	-	0.546	-	-
Subjective norms_1	-	-	-0.937	-
Subjective norms_2	-	-	-0.857	-
Subjective norms_3	-	-	-0.702	-
Self-protective behavior_1	-	-	-	0.852
Self-protective behavior_3	-	-	-	0.841
Self-protective behavior_2	0.368	-	-	0.461

Note: factor loadings lower than 0.3 are omitted.

Furthermore, we tested for construct reliability by calculating Cronbach alpha (CA). Since values of CA ranged from $\alpha = 0.777$ to $\alpha = 0.924$ we assume adequate construct reliability. Remaining CA values are presented in Table 3 (in diagonal, bold). Discriminant validity was tested with Pearson correlation coefficient (Table 3). None of the inter-construct correlation coefficients exceeded the threshold value of 0.7. Additionally, other assumptions for linear regression (i.e. homoscedasticity, normality of residuals, multicollinearity) were carefully considered.

Table 3:
Pearson
correlation
coefficient
matrix

ID		1	2	3	4
1	Subjective norms	**0.878**			
2	Perceived behavioral control	0.282***	**0.777**		
3	Self-protective behavior	0.376***	0.113	**0.847**	
4	Attitude	0.347***	0.087	0.599***	**0.926**

* - p < 0.05; ** - p < 0.01; *** - p < 0.001

4.2 Differences between Young Adults and Others

The focus of our research is to examine perceptions of young adults in times of COVID-19 epidemic, their self-protective behavior, and test the predictive factors according to the theory of planned behavior. Therefore, we split the sample and created two groups of respondents: (a) those who are 30 years old or younger (young adults) and (b) those who are 31 years old or older (others). According to these groups, we hereafter present the results separately.

First, we aggregated the indicator variables into constructs by calculating arithmetic mean values. Table 4 presents the arithmetic means [M], standard deviations [SD], median [Me] and modes [Mo] of the aggregated constructs. Additionally, we compared the means with *independent sample t-test* which showed no statistically significant differences between the groups in any of the observed aggregated variables. That answers our first research question.

	Group	M	SD	Me	Mo	t
Subjective norms	under 30	4.31	0.67	4.17	5.00	0.834
	over 30	4.23	0.76	4.00	5.00	
Perceived behavioral control	under 30	3.97	0.82	4.00	5.00	-0.285
	over 30	3.99	0.80	4.00	5.00	
Self-protective behavior	under 30	4.08	0.89	4.00	5.00	0.841
	over 30	3.98	0.99	4.00	5.00	
Attitude	under 30	3.10	0.96	3.00	3.00	-0.686
	over 30	3.19	1.19	3.14	5.00	

Table 4: Descriptive statistics and results of independent sample t-test

To answer the second research question, we tested a theory of planned behavior with two multiple linear regression models. Both models include the same constructs. However, the first model predicts self-protective behavior among young adults (model A, Figure 2), and the second model predicts self-protective behavior among others (model B, Figure 3). Both models are statistically significant (p < 0.001). Standardized coefficients beta values are written on the arrows while the R^2 value is written in the dependent variable rounded rectangle.
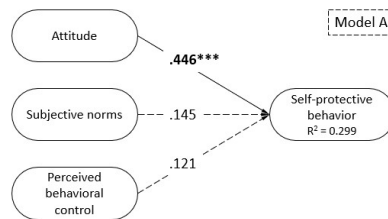

Figure 2: Results of the multiple linear regression model for young adults

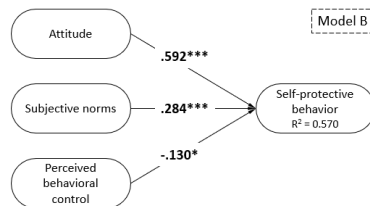** - p < 0.05; ** - p < 0.01; *** - p < 0.001*

Figure 3: Results of the multiple linear regression model for others

* - p < 0.05; ** - p < 0.01; *** - p < 0.001

The results show that approximately 30 percent of the variance of self-protective behavior can be explained by predictors from the theory of planned behavior among young adults, where only one predictor (attitude) is statistically significant ($p < 0.001$). In others, the same predictors explain more than 50 percent of the variance of self-protective behavior, where all the predictors are statistically significant. These results answer the second research question.

5   DISCUSSION

Research, which was conducted among Slovenian speaking Facebook users, resulted in several findings. We found no statistical differences in self-reported self-protective behavior among the two age groups. Both groups also reported a relatively high level of compliance with self-protective measures. This finding deviates from findings of other studies on health-related behavior in times of pandemic, as most studies conclude that the younger population does not follow protective measures as strictly as the older population (Barr et al., 2008; Qeadan et al., 2020; Szabo et al., 2020; Teasdale et al., 2012). However, this finding can mostly be attributed to the timing of conducting the research. We conducted our research in the middle of the first wave of COVID-19 infections in Europe, when the most restrictive measures were in place in Slovenia (e.g., ban on social gatherings, restrictions on movement between municipalities). In addition to the strictness of protective measures, fines were also envisaged for violations of some protective measures (Ordinance on the temporary general ban on the movement and gathering of people in public places and areas in the Republic of Slovenia and the ban on movement outside municipalities, 2020). This measures increases the level of compliance with protective measures (Tang, 2020). It is also vital to acknowledge that in time of conducting research, COVID-19 was rather unknow disease, which led to higher levels of uncertainty (Ölcer et al., 2020) and fear of disease (Fofana et al., 2020). Both these factors may impact the compliance with protective measures, as researches in later stages of COVID-19 pandemic showed that lower levels of fear and more information about the disease leads to lower levels of compliance with protective measures (De Coninck et al., 2020).

Nevertheless, significant differences among age groups can be observed from the theory of planned behavior perspective. Only the attitude is significantly associated with self-protective behavior among young adults. In contrast, among others, all three predictors are significantly associated with self-protective behavior, explaining nearly twice the variance. This indicates that younger adults are more difficult to control, as their intent to self-protect is mostly based on their own beliefs and experiences. This may stem from young adults' lower levels of trust in important actors, such as governments, media, and medical specialists in times of pandemic, compared to other age groups (Freimuth et al., 2014).

For both, young adults and other age groups, attitude towards protective measures seems to be the most important predictor of self-protection. This is in line with previous research of theory of planned behavior in pandemic situations (Bae & Chang, 2020; Masser et al., 2011; Zhang et al., 2020a; Zhang et al., 2020b). Since attitude is individual's overall assessment of the intended behavior that is

formed based on their evaluations and perceived outcomes (Ajzen, 1991) and is strongly influenced by risk perception of the disease (Zhang et al., 2020b), our results are in line with findings of other studies (Fofana et al., 2020; Ölcer et al., 2020). Individuals in the early stages of the COVID-19 self-protected based on their beliefs, which may derive from perceived threat and fear of disease. The attitude was found to be a stronger predictor among the older population, which is sensible, as the older population seems to be more threatened by infectious diseases as young adults (Szabo et al., 2020; Williams et al., 2012).

Importance of attitude for self-protective behavior among young adults can also be explained trough lack of trust towards external information on the disease by young adults. Since they show lack of trust towards important actors (Freimuth et al., 2014), social networks are the main source of information on the COVID-19 pandemic (Abdelhafiz et al., 2020; Mubeen et al., 2020). However, information about COVID-19 on social networks are often conflicting and misleading. Consequently it is hard for users to know which information to trust (Abdelhafiz et al., 2020).

Contrary to theory, which suggest that subjective norms are an important predictor of younger adults' behavior (Latimer & Ginis, 2005), our findings suggest, that subjective norms do not predict young adults' intention to self-protect in pandemic situation. This is particularly important finding, since subjective norms appear to be especially important predictor of health-related behavior (Finlay et al., 1999). Friends and family appear to be important source of information on COVID-19 for young adults (Hashim et al., 2020), however our results indicate that young adults do not decide to self-protect based on information from people who they are close with. This may show that young adults may not find people who they are close with reliable sources for COVID-19 related information. Importance of subjective norms for predicting older population's health behavior does vary across different studies (Deng et al., 2014; Zhang et al., 2020a; Zhang et al., 2020b), however, we found that subjective norms are an important predictor of self-protective behavior among other age groups. This can be explained by tendency of older population to rely on people who are close to them in times of public health crisis (Zhang et al., 2019).

5.1   Implications of the Study

Our study provides several implications, both for theory and practice. First, to the best of our knowledge, this is the first study investigating predictors of self-protective behavior derived from the theory of planned behavior in times of COVID-19 among young adults. Furthermore, this is, to the best of our knowledge, the first study that explores differences in predictors of self-protective behavior among different age groups in times of COVID-19. It provides an insight into what motivates young adults to self-protect. Second, our results show that the theory of planned behavior does not offer a sufficient explanation of self-protective behavior among younger adults. This indicates that the presentation of the public health crisis to the younger audience should be done carefully. Third, since our results show the importance of attitude for self-protection motivation, authorities

should try to influence the attitude toward self-protective measures among young adults. Fourth, contrary to previous studies, our findings imply that the beliefs of people who are close to them do not affect young adults' decision to self-protect.

5.2 Limitations and Future Work

Like any other, our study has several limitations. First, the survey was distributed only among Facebook users. Hence, the research did not include respondents that are not Facebook users. Second, responses were collected by convenience sampling, which is a non-probability sampling method. Third, data were collected in a short timeframe to investigate the self-protective behavior in the peak of the pandemic in Slovenia. Thus, the sample size is relatively small, mostly consists of responses from female respondents. Fifth, respondents come from only one European country. Therefore, a generalization of the results should be made with caution.

Future research should firstly include observing more than two age groups. Due to the relatively small sample size, we were limited to dividing the sample into only two groups. Second, since the theory of planned behavior addresses only internal factors influencing one's behavior, other theories addressing external factors should also be tested. Addressing such factors is vital since self-protective behavior was commonly enforced by law enforcement authorities and informal social control. Third, since our results indicate that self-protective behavior among younger adults is difficult to predict with the theory of planned behavior, future work should include searching for factors that can better predict such behavior.

6 CONCLUSIONS

With the outbreak of the COVID-19 pandemic in early 2020, the way of life as we knew it entirely and unexpectedly changed. The high threat to public health has required people to make changes in their daily routine activities. The preventive measures have significantly limited our fundamental freedoms. With the introduction of new and obligatory self- protective measures and introduction of (hitherto unknown) formal and informal social control over the compliance with expected behavior, people were faced with uncertain circumstances that contributed to different views on the new situation. It is important to investigate such differences that people will follow measures and instructions, develop a sense of collective responsibility, and work together to maintain public health. However, since the recommended measures and accompanying supervision introduced new practices that people were not used to, it is vital to understand which factors in such situations influence people's behavior or their willingness to follow the newly introduced rules. This research addresses the question of which factors influence different age groups' behavior and, therefore, help understand these groups' perceptions and behavior in times of pandemic.

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