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The role of risk perception and affective response in the COVID-19 preventive behaviours of young adults: a mixed methods study of university students in the Netherlands

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ABSTRACT

Objectives Due to an increased infection rate among young adults, they need to adhere to the preventive guidelines to stop the spread of COVID-19 and protect vulnerable others. The purpose of this mixed methods study was to explore the role of risk perception and affective response in the preventive behaviours of young adults during the COVID-19 outbreak.

Setting This study followed a convergent mixed methods design, in which a quantitative online survey (n=1081) and 10 qualitative in-depth semistructured video interviews were conducted separately in the Netherlands during April–August 2020.

Participants 1081 participants filled in the online survey, and 10 participants participated in the interviews. Eligibility criteria included being a university student.

Primary and secondary outcome measures Data on risk perception, affective response, that is, worry, and adherence to preventive guidelines were combined and analysed during this study. There were no secondary outcome measures.

Results The results showed that young adults perceived their risk as low. Their affective response for their own well-being was also low; however, their affective response was high with regards to vulnerable others in their surroundings. Due to their high impersonal risk perception (ie, perceived risk to others) and high affective response, young adults adhered to most preventive guidelines relatively frequently. However, young adults sometimes neglected social distancing due to the negative effects on mental health and the uncertainty of the duration of the situation.

Conclusions In conclusion, high impersonal risk perception and high affective response regarding others are key motivators in young adults' preventive behaviour. To maximise adherence to the preventive guidelines, risk communication should put emphasis on the benefits to vulnerable others' health when young adults adhere to the preventive guidelines.

Strengths and limitations of this study

- By using a mixed methods approach, results of the qualitative analysis support the quantitative results and provide insight into risk perception, affective response and preventive behaviour.
- The quantitative study sample was large and diverse in participant characteristics, increasing the external validity of this study.
- The study group was university students in the Netherlands, hence findings may not be generalisable to other age groups or to lower educational levels.

INTRODUCTION

On January 30 2020, the WHO declared COVID-19 as a Global Public Health Emergency.[1] Following this declaration, preventive guidelines have been implemented in order to prevent the spread of COVID-19.[2] These preventive guidelines include, for example, frequently washing one's hands and social distancing.[3] In order to prevent the spread of the COVID-19 and flatten the curve of infections, it is important for everyone to adhere to these guidelines.[2]

However, not everyone seems to be at high risk of the dangerous consequences of COVID-19. Young adults (between ages 20 and 40 years) appear to be at lower risk than older adults and adults with comorbidity (eg, cardiovascular diseases).[4–6] Moreover, intensive care unit(ICU) admissions and death rate among younger adults were considerably low.[5] Nevertheless, it is still important for young adults to adhere to the preventive guidelines, as research shows that most new COVID-19 infections originate from the younger population (ages 20–49 years).[7 8] In order to help stop the spread and protect vulnerable others, young adults must therefore adhere to the preventive guidelines more strictly.[4 5]

Due to a lower percentage of hospitalisation and death induced by COVID-19, young

adults might underestimate their risk of COVID-19.[9] According to models of behaviour change, perceived risk of COVID-19 can motivate preventive behaviour, such as adherence to the preventive guidelines.[10–12] Perceived risk can be divided into two psychological dimensions, namely perceived vulnerability and perceived severity.[2 13] Perceived vulnerability includes how likely one thinks one can be infected with COVID-19, whereas perceived severity encompasses the perceived seriousness of the symptoms of COVID-19 and whether one would survive the disease.[2 13] Distinguishing perceived severity and perceived vulnerability is relevant, as research shows an overestimation of harm regarding COVID-19 and an underestimation of capabilities to minimise infection.[14]

In addition to personal risk, individuals might also consider the impersonal risk that could motivate them to engage in preventive behaviour, namely the risk COVID-19 poses to other individuals.[11] Risk perception, personal and impersonal, is therefore a key component in understanding whether young adults take preventive action against COVID-19 and how to motivate them to do so.[15 16] Next to risk perception, affective response (eg, worry) also plays a relevant role in stimulating preventive behaviour.[15 17] Studies have shown that risk perceptions may evoke an affective response that can in turn elicit preventive behaviours.[18 19] A recent study has found fear to be an important driver of preventive behaviour in the COVID-19 outbreak.[20]

A knowledge gap exists on the factors that drive young adults' preventive behaviours and adherence to COVID-19 guidelines, while an increased infection rate among young adults is found and consequences of spreading COVID-19 are serious.[7 8] Moreover, it is important to investigate predictors of COVID-19 related behaviours, as some predictors of this behaviour appear to be unique to the COVID-19 pandemic.[21] The aim of this study is to gain insights into the role of risk perception and affective response in young adults' preventive behaviour during the COVID-19 outbreak.

METHODS

Study design and setting

This study followed a convergent mixed methods design, which means that quantitative and qualitative data collection occurred in a similar time frame.[22] An online survey was carried out in May–August 2020,[8] and qualitative semistructured in-depth interviews were conducted in April–May 2020. Both methods of data collection inquired about similar topics. After separate data collection was completed, these two databases were merged for analysis. Data from the quantitative survey were used in order to investigate the relationships between the central concepts of this study, namely risk perception, affective response and preventive behaviour.[22 23] Then, the qualitative interviews were used to further explore these relationships. Integration of both quantitative and qualitative data was done to further enhance the validity of the results.[22]

Patient and public involvement

Neither patients nor the public were involved in the design, or conduct, or reporting, or dissemination plans of our research.

Quantitative methodology

Participants

A total of 1081 (applied) university students were included in the online survey. They were asked to fill out the online questionnaire. Participants were recruited using a combination of mailing distribution (via mailing lists of the universities), distribution via Canvas digital environment and targeted distribution (announcements during lectures and classes, requested to participate). The participants were informed about the aim of the study, the methods of data collection and data protection and storage. Prior to data collection participants gave their informed consent digitally. The mean age of participating students was 22.87 years. About half of the sample were male (n=537), seven classified as 'other' and four students did not indicate their gender.

Data collection and variables

The online survey examined how young adults were dealing with the COVID-19 outbreak. The survey included the following concepts: risk perception, affective response, adherence to preventive measures and background characteristics including age and gender. Risk perception was operationalised in the survey as vulnerability: 'Do you estimate yourself to be in a risk/vulnerable group for COVID-19?'. Choices included: *no* and *yes, why?*. Next to that, the online survey measured affective response as worry: 'How worried are you about getting COVID-19?' on a 6-point Likert scale, ranging from *0=not at all* to *5=highly worried*. Moreover, preventive behaviour was measured by inquiring about the adherence to six preventive measures on a 5-point Likert scale ranging from *always (1)* to *never (5)*. This was recoded for a higher score to indicate a higher adherence. The following measures were included: staying at home as much as possible, maintaining distance when meeting others, using masks and/or gloves in public places, avoiding meeting friends and family, washing hands frequently and avoiding touching eyes, nose and mouth. Finally, participants were asked about their age (in years) and gender (male, female and other).

Qualitative methodology

Participants

The qualitative methodology that was used in this study was phenomenology. Data were collected by interviewing 10 young adults. These young adults studied at the Erasmus University Rotterdam and were recruited via multichannel strategy as the campus was in full lock-down during this study. Potential participants were recruited using convenience sampling and snowball strategies. Due to this, some of the interviewees were acquaintances of the interviewer (JK). Prior to entering the qualitative

Table 1 Characteristics of the interviewed participants (n=10)

Participant	Gender	Ethnicity
James	Male	Native
Tom	Male	Non-native
Roxanne	Female	Non-native
Fey	Female	Non-native
Lianne	Female	Non-native
Jessica	Female	Native
Andrea	Female	Non-native
Julius	Male	Native
Paige	Female	Native
Mark	Male	Native

study, all participants were informed about the aim of the study, the methods of data collection and received information about data protection, usage and storage. Participants gave verbal informed consent.

The interviewed participants were on average about 24 years old (ranging from 21 to 29 years). Most were born in the Netherlands (native) (80%). However, half of the interviewees had parents with a non-native background or were born abroad themselves (50%). More than half of the participants were female (60%). Half of the participants were bachelor students and half were master students. Participant characteristics can be found in table 1.

Data collection

Interviews were conducted online via Skype. The interview guide was structured around the concepts risk perception,[2] affective response[18 19] and preventive behaviour.[24 25] In order to avoid bias, the questions have been posed as open-endedly and neutrally as possible. The interviews were audio-recorded and transcribed. For anonymity, pseudonyms were used in the transcriptions of the interviews and in this manuscript.

Data collection continued until data saturation of main themes occurred. After that, three additional interviews were conducted to ensure saturation. This resulted in a total of 10 in-depth interviews with a duration of approximately 1 hour. To enhance trustworthiness of the qualitative data, a member check was performed after transcription of the interviews.

Data analysis

Survey data were analysed using IBM SPSS (V.26). First, frequencies of each variable and the mean and SD of affective response and preventive behaviour were calculated. Second, a multiple regression analysis was run to examine the relationships between the independent variables (namely risk perception, affective response, age and gender) and the dependent variable (namely adherence to measures). Any missing values were excluded from the analysis. After having determined the existence of these relationships, the qualitative data from the interviews was used to further explore these relationships.

The interviews were analysed by performing a thematic analysis using the program ATLAS.ti (V.8). To facilitate the analysis, the first author (JK) created a codebook based on the concepts risk perception, affective response and preventive behaviour. Additionally, open coding from the answers of the participants was used to further develop the codebook. Subsequently, two coders (JK and FH) coded one interview independently. The intercoder reliability was calculated in ATLAS.ti using the Krippendorff's alpha coefficient. This resulted in a coefficient range of 0.48–0.67, which is considered sufficient for exploratory academic research as such.[26] Differences were discussed until consensus was reached. The remaining interviews were coded by one coder (JK) and discussed with the research team to enhance reliability.

RESULTS

Quantitative results

Ninety per cent (n=660) of participants reported not to be at risk of COVID-19. Some young adults (n=74, 10%) who perceived that they were at risk of COVID-19 reported that they had pre-existing respiratory conditions. Young adults also reported little worry about COVID-19 (M=1.81, SD=1.24, range 0–5).

Figure 1shows the adherence of young adults to the preventive guidelines. It shows that young adults adhered more frequently to three out of six guidelines, namely washing hands frequently, staying home as much as possible and maintaining distance when meeting others. They adhered less frequently to avoiding touching eyes, nose and mouth, avoiding meeting with friends and family and wearing masks and/or gloves in public places. The latter is understandable as it was not an official guideline when this study took place. Overall, young adults adhered to the guidelines relatively frequently.

Next to that, a significant regression was found: (F(4, 679)=33.44, p<0.001, r2=0.165). The regression showed that risk perception, affective response and gender have significant relationships with preventive behaviour. This means that the more young adults perceived to be at risk of COVID-19 (B=–0.074, p=0.039) and the more they worried about it (B=–0.354, p<0.001), the higher their adherence to the preventive guidelines was. Moreover, the regression model showed that women adhered to the preventive guidelines more often than men did (B=–0.107, p=0.002). Age was not significantly related to preventive behaviour (B=–0.029, p=0.420).

Qualitative results

Risk perception

In the interviews, young adults perceived their chance of being infected with COVID-19, when adhering to the preventive guidelines, as low. One student explained: '*Seeing the fact that I am mostly home and just have contact with my family, the chances are very low*' (Andrea). When

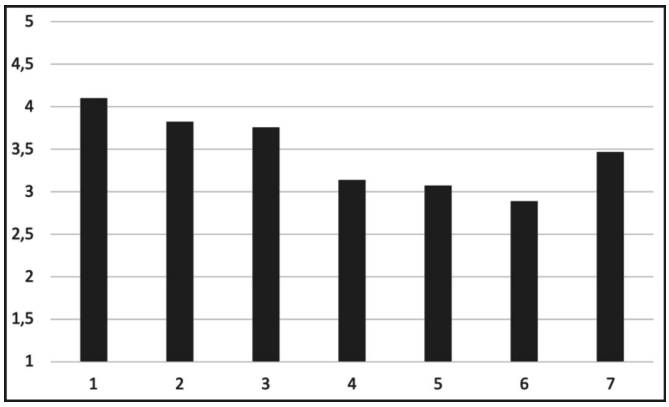

Figure 1 Young adults' adherence to the preventive guidelines. Source: online survey (means of item scores with a range of 1–5). Figure legend (x-axis) 1: washing hands frequently; 2: staying home as much as possible; 3: maintaining distance when meeting others; 4: avoiding touching eyes, nose and mouth; 5: avoiding meeting with friends and family; 6: wearing masks and/or gloves in public places; and 7: overall adherence.

not taking any preventive measures, young adults perceived that their chances of being infected with COVID-19 would be high: '*I think the chance of contamination without following the guidelines would be ninety-eight percent*' (Roxanne).

> Most young adults perceived that the symptoms of COVID-19 could be serious, but that the seriousness also depended on the person. Mark explained: *'They [the symptoms] can be very serious. But there is a spectrum. I see it as a semi lottery, a lottery that you can influence with your body.'* Most of the young adults concluded that they would be cured if they were infected: *'I am relatively healthy. Seeing my age and history I think I would only get a cold and be cured*'. (Jessica)

Affective response

Young adults did not worry for their own health. '*I am still fairly young and generally I am in good health so I am not afraid of getting sick*' (James). However, they were aware of the high risk of COVID-19 to vulnerable others, which led to a high affective response for these vulnerable others:

> I really started to think about what it meant for my direct surroundings. Not really what it means for me. Imagine if I were to get the virus, then I would contaminate my parents and little brothers too. The idea that I can infect someone else, that really scares me. (Andrea)

Fey, Lianne and Mark expressed anxiety when receiving risk information on COVID-19. Due to this anxiety and worry that arose due to COVID-19 risk information, they let go of actively searching for this information. Fey elaborated: *'I think if I go deep into it – like my mother does – I will create deep anxiety for it and I will probably go crazy'*.

Preventive behaviour

Generally, young adults adhered to the preventive guidelines. James elaborated: '*I definitely keep the one-and-a-half-meter distance, especially when I see an elderly person. I do try to use the information about the guidelines to guide my life*'. In addition to the impersonal risk and high affective response because of vulnerable others, the information young adults received on COVID-19 also motivated them to adhere to the preventive guidelines. Fey explained how the information she received influenced her behaviour: '*You get so many messages about it.… It keeps you occupied and you hope nobody in your family gets infected. So every time I go to visit my family, I wash my hands extra carefully and keep my distance*'.

Moreover, young adults' social surroundings motivated them to adhere to the guidelines by seeing family adhere to the guidelines: '*In the beginning I thought it was very extreme what my parents were doing, but on the other hand I do think it is good what they are doing [keeping to the preventive guidelines very strictly]. You reduce the chance of getting it [COVID-19]*' (Lianne).

However, even though young adults seemed to understand the urgency and efficacy of adhering to the preventive guidelines, some young adults experienced frustration when others showed a high level of adherence to the guidelines: '*Some people are so panicky about it, it is too much. I just want to do my groceries calmly without being reminded constantly "corona corona corona"*' (Fey). Julius agreed: '*Sometimes I get a little annoyed. Sometimes it is somebody I know and I think they are overreacting. Personally I don't feel like it is as severe as they tend to make it out to be*'.

In addition, young adults did not always practice social distancing with family and friends: '*With my mum, sister and dad I don't practice the one-and-a-half-meter rule. I still visit my dad*' (Paige). Mark experienced COVID-19 close to him, as two family members were infected by it and one consequently passed away. However, he still did not keep distance when meeting with friends: '*I'll be honest, when I see my friends I don't keep to those rules. Of course, I keep to them in the sense that I don't see more than two people at the same time. But then I am not super aware of keeping the distance*'.

Possible reasons for young adults' negative attitude towards others' adherence and young adults' low adherence to social distancing could be the negative effect it had for some on their mental health. Mark explained that he experienced some mental health problems before and that keeping to the guidelines would mean sacrificing his mental well-being: '*I am not willing to sacrifice my mental health purely for the little bit more reassurance of being well physically*'. The uncertainty of the duration of the guidelines also made it hard to stick to the guidelines. Paige elaborated on this:

> I think the biggest barrier would be the uncertainty of how long. If they would just say till the first of June this is it, and afterwards it will be fine. I think then it would be so much easier for people to adhere to all of it. But as soon as they say we really don't know

how much longer, people become more ignorant or impatient to the rules.

DISCUSSION

This study explored the risk perceptions, affective responses and preventive behaviours of young adults during the COVID-19 outbreak using a mixed methods design.

Individuals are more likely to engage in preventive behaviour if they perceive that they or others are at high risk of a disease.[10–12] Risk perception might also evoke an affective response, which can also motivate individuals to adhere to preventive guidelines.[15–20] Our survey confirms that risk perception and affective response are determinants of preventive behaviour by showing that the higher the perceived risk and worry of COVID-19, the more young adults adhered to the preventive guidelines. However, our study adds that it is high perceived risk and worry for vulnerable others that increases young adults' motivation and adherence to preventive measures. This is an important addition to understanding the motivations of young adults behind their COVID-19 preventive behaviour.

While reported adherence to the guidelines was relatively high, we also saw a discrepancy between young adults' intention to adhere to the guidelines and their actual adherence. Despite perceiving a high risk and worry for vulnerable others, young adults also stated that they did not always adhere to social distancing when meeting friends or family. Notably, a low adherence to social distancing was also found by Park and Oh.[27] This discrepancy between intention and behaviour that we found in our study, is also known as the intention–behaviour gap.[28] It is important for risk communicators to be aware of this intention–behaviour gap and consider possible intervening variables, such as emotion, that prevent young adults from transforming their intentions into behaviour.

One reason, found in this study, why young adults did not always turn their intention into behaviour by adhering to social distancing is because they felt that it negatively impacted their mental health. Marroquín *et al*[29] found something similar in their study suggesting that social distancing correlates with negative mental health such as depression and stress. As humans are social beings, it is not surprising that prolonged periods of isolation or distancing can cause psychological distress.[30] Additionally, research conducted during a previous infectious disease outbreak, namely severe acute respiratory syndrome, has shown that especially young people are at risk of psychological complaints due to an outbreak.[31]

Another barrier between intention and behaviour was that young adults felt uncertain about the duration of the pandemic and the guidelines, leading to a lesser adherence to social distancing. Williams *et al*[32] found similar results in their qualitative study.

Moreover, in our survey, we found that female young adults showed higher adherence to preventive guidelines than male young adults. This is in line with earlier studies.[33–36] One reason for this might be males' higher reactance to direction, such as following preventive guidelines against COVID-19.[37]

Strengths and limitations

By conducting a mixed methods study, the results of the qualitative analysis support the quantitative results and provide insight into risk perception, affective response and preventive behaviour. In order to increase internal validity, this study based the survey and topic list on validated questionnaires and theoretical models.[38] Moreover, the sample size and diversity of the participant characteristics of the quantitative study may increase the generalisability of our results.

However, one might argue that 10 interviews in the qualitative study were not enough from which to draw conclusions. Nevertheless, according to Dworkin and Hennink *et al*,[39 40] the sample size of interviews in qualitative research can vary between five up to 50. In addition to fitting in this proposed margin, saturation was reached within ten interviews.

Implications for practice

Our study has relevant implications for risk communicators, considering young adults' relative perceived vulnerability and worry for others in the environment. In addition to communication about the importance of personal protection from the virus, risk communicators should also consider impersonal risk and worry for others by emphasising the possibility of saving vulnerable others of the dangers of COVID-19, while especially emphasising the importance of social distancing.

Moreover, considering the limited search and consumption of COVID-19 risk information due to its worry-inducing properties, risk communicators should consider providing more positive risk information that is motivating and reassuring by showing the benefits and statistics of the effectiveness of the preventive guidelines, rather than solely focusing on statistics of death and infection rates. This might reduce worry and in turn reassure and motivate young adults to adhere more strictly to the guidelines.

Also, prolonged periods of isolation can cause psychological distress. Hence, it is important to allow regular social contact for the mental well-being of young adults. Risk communicators should take this into account by instilling guidelines such as allowing a group of young adults to gather, if they adhere to certain guidelines such as keeping distance and wearing face masks. Moreover, psychological support should be available for young adults in order to diminish the negative impact on their mental health.

Implications for research

Combining both quantitative and qualitative research methods allowed us to experience the benefits of both.

We therefore recommend a combination of both methods for a more comprehensive view.

The results of this study provide valuable knowledge regarding young adults' perceptions; however, more research needs to be done to fully understand the underlying reasons why young adults do not always adhere to social distancing while they understand the importance and urgency of adhering to this guideline.

CONCLUSION

This study showed that young adults adhered to the preventive guidelines relatively frequently, with factors such as (impersonal) risk perception and affective response being important motivators for adherence. Perceiving a high risk for vulnerable others sparked worry in young adults, which motivated them to adhere to the preventive guidelines to protect vulnerable others around them. However, due to barriers such as negative effects on mental health and uncertainty regarding the duration of the pandemic, young adults sometimes neglected social distancing. Psychological support should be accessible for this group to mitigate the negative effects of social distancing. These findings also suggest that risk communication should focus even more so on the importance of adherence to preventive guidelines for the well-being of vulnerable loved ones and especially on the importance of social distancing. This might lead to an increase in young adults' awareness of the positive impact their preventive behaviour can have on vulnerable others' health, and in turn increase their adherence to the preventive measures.

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Collaborators No collaborators.

Contributors All authors conceptualised the study. ES collected data for the quantitative part; JK collected data for the qualitative part as part of her masters' programme at the Erasmus University Rotterdam, the Netherlands. ES and FH analysed the quantitative data. JK analysed the qualitative data with support of FH, prepared the first draft of the manuscript with feedback and suggestions of PK and FH and acted as corresponding author. PK, ES and FH critically revised the manuscript and provided feedback. JK prepared the final manuscript. All authors read and approved the final manuscript. FH acts as guarantor.

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Patient consent for publication Not applicable.

Ethics approval This study was carried out in accordance with the ethical guidelines of the Declaration of Helsinki with digital informed consent (survey) and verbal informed consent (interviews) provided by all participants. In addition, the qualitative study was reviewed and approved by the Erasmus School of Health Policy and Management Examination Board. Medical ethical approval was not required under the Dutch act on Medical Research Involving Human Subjects, because the study did not involve manipulation or data of patients. Participants could withdraw from the study at any time without negative consequences, and data were processed anonymously. Participants gave informed consent to participate in the study before taking part.

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