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# What makes Dutch youth comply with preventive COVID-19 measures? An explorative study

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## Abstract

The measures to contain the spread of COVID-19 are challenging for youth, especially the social isolation measures. These measures are antagonistic to healthy youth development, which requires sufficient social contact with peers and adults. This explorative study examined what factors are associated with adherence to COVID-19 measures in a sample of Dutch youth ( $N = 263$ ; 79.8% female) with ages ranging between 16 and 24 years ( $M = 21.1$  years;  $SD = 2.44$  years), who completed an online questionnaire about their compliance to measures, resilience, coping strategies, mental health, and availability of a natural mentor. Results showed that youth with fewer depressive symptoms adhered better to measures of social distance. Youth who were less suspicious, more resilient, and those with an active coping strategy or a natural mentor more often complied with COVID-19 measures. These results can be used to help youth comply with the COVID-19 measures.

## KEYWORDS

coping, natural mentoring, Covid-19, mental health, resilience

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## 1 | INTRODUCTION

The COVID-19 virus is spreading around the world, causing great damage to people's health and the economy (World Health Organization, 2020). Therefore, preventive (isolation) measures are used to limit the spread of the virus (Naeem et al., 2020), including measures of social distancing, and limiting close face-to-face contact with others. Research shows that these measures have a strong potential to reduce the magnitude of the COVID-19 pandemic peak and reduce the number of infections (Prem et al., 2020). Lowering and flattening the curve of spread is important to reduce acute pressure on the health care system. Premature and sudden lifting of measures can lead to a new peak or even a second or third wave of local or worldwide infections, which is why a gradual phasing out of measures is recommended (Prem et al., 2020). Preventive measures are deemed essential for public health, but also may have adverse social and economic consequences, which are likely to lead to psychosocial and mental health problems, including loneliness, stress, anxiety, and depression (Naeem et al., 2020).

Negative behavioral responses (e.g., not staying at home, while having flu-like symptoms) of the population to pandemics can significantly exacerbate the negative impact of the pandemic on public health (Teasdale et al., 2011). On the contrary, positive behavioral responses (e.g., staying at home, while having flu-like symptoms) can limit the negative impact of the pandemic on public health (Teasdale et al., 2011). Both behavioral responses can arise in a pandemic. Therefore, the specific vulnerabilities and protective mechanisms of any population experiencing a pandemic should be investigated (Bruce-Barrett et al., 2007). For example, recent global attention for influenza pandemics has focused on governmental restrictions. In view of the developments of COVID-19, it is important for policy- and decision-makers of the government and healthcare institutions that scientific evidence about the effectiveness of preventive measures is available, in particular scientific evidence about which factors can increase the effectiveness. In this way, evidence-based guidelines can be developed to increase the effectiveness of (restrictive) preventive measures, while limiting their negative effects (Brooks et al., 2020). Studies show that informing people about the efficacy of preventive measures and trust in the government can lead to better compliance with government rules and recommendations (Bargain & Aminjonov, 2020; Clark et al., 2020; Liao et al., 2010). Better compliance with government rules and recommendations may decrease the number of COVID-19 cases and, therefore, limit the negative impact on public health (Teasdale et al., 2011).

A pandemic outbreak affects everyone in society, including youth (Bruce-Barrett et al., 2007). However, there is little research on the behavior of youth during a pandemic (United Nations, 2021). Some published plans seem to have skipped some unique considerations pertaining to youth, limiting the pandemic response in its effectiveness (Bruce-Barrett et al., 2007). The current exploratory research examines what is decisive for youth to comply with and/or follow the (restrictive) preventive measures for the spread of COVID-19.

The importance of research on youth behavior in a pandemic outbreak is multifaceted. Research on past pandemics shows that young people react differently, both physically and mentally, from adults during the period of an outbreak (Ragelienė 2016). In addition, the measures imposed by the government to combat a pandemic often have an unpleasant side effect on adults, whereas the consequences for young people are often expected to be more immediate and greater, having an excessive impact on their social life, development opportunities, well-being and physical and mental health (Bruce-Barrett et al., 2007; Koller et al., 2010; Ragelienė 2016). Research on the behavior of youth during a pandemic ensures that measures to combat the current or future outbreak(s) can meet the needs of youth. In addition, research findings can facilitate the successful implementation of (restrictive) preventive measures that target youth, including their compliance with these measures. Moreover, COVID-19 research on youth means that the perspective of youth can be taken into account in governmental health policies and might be the first step in (active) involvement of youth in the COVID-19 health care policy, which contributes to the realization of their fundamental participation rights (Koller et al., 2010).

## 1.1 | Social isolation during the COVID-19 pandemic

What makes that the response of youth can be so different from that of adults? Youths are part of a complex social network that supports their growth, learning, and development (Bruce-Barrett et al., 2007), where social contact with peers and adults is essential for their motivation and to develop into a balanced adult person, who is competent and able to independently make the right decisions (Ryan & Deci, 2017). Notably, social change is a characteristic of youth development (Steinberg, 2008). Identity development in youth primarily takes place in relation to other people (Erikson, 1968; Kroger et al., 2010). The (social) isolation measures youth must comply with to combat COVID-19 are, therefore, at odds with the developmental challenges of young people growing into adulthood, in which social processes are primary; not only with respect to peers (Ragelienė 2016) but also with regard to adults (Bowers et al., 2015; Kesselring et al., 2016). This is most explicitly reflected in restrictions on being able to attend education in a regular manner, which cannot only lead to a backlog in knowledge and skills (the qualification dimension of education) but which also drastically reduces the possibilities for socialization and personality development through education (Biesta, 2014). A month-long period of social isolation, therefore, probably has a major impact on youth (Remie & Veldhuis, 2020). There is also empirical evidence showing that youth do not comply with social distancing measures as much as adults (e.g., Cohen et al., 2020; Park et al., 2020), due to their relatively strong desire for social connections (Muellerer et al. 2021). Moreover, they have been shown to have an increased risk for spreading the virus due to their large social networks and frequent encounters with peers and adults (e.g., Andrews et al., 2020; Nivettete et al. 2021; Wrzus et al., 2013).

## 1.2 | Resilience

The preference for dealing with a pandemic lies in harnessing and strengthening the resilience of the individual and the community (Bruce-Barrett et al., 2007). Resilience is a form of positive adaptation when faced with adversity or significant risk (Masten & Powell, 2003). Resilience is also described as the qualities of both the individual and the individual's environment that enhance positive development (Ungar & Liebenberg, 2011). This also emphasizes the importance of the interaction between the individual and its social environment. Research has shown that resilience is positively related to health-promoting behavior (Naeem et al., 2020). For example, resilient youth could come up with their own ideas to cope with difficulties during a pandemic, which is evident in the following fragment of an interview held with an adolescent: "without a lecture and part-time job my rhythm falls away, then I set my alarm clock myself. That helps enormously to feel good about myself" (Remie & Veldhuis, 2020).

## 1.3 | Natural mentoring

Research by Liao et al. (2010) shows that trust in informal information about a pandemic is strongly associated with the perceived health threat and social avoidance. As youth increasingly need autonomy, parents may not be the first and preferred persons to take information from van Dam et al. (2018) and Zimmer-Gembeck and Collins (2003). Notably, adolescence is characterized by a decrease in the intensity and frequency of communication between youths and their parents (Keijsers & Poulin, 2013). For youth, the relationship with a "natural mentor," in addition to the relationship with parents, becomes increasingly important (van Dam et al., 2018). A natural mentor may be a nonparent relative, neighbor, teacher, (adult) friend, or someone from a religious community, who is a confidant and advocate for the youth (van Dam et al., 2018). They can provide support which can enhance the sense of belonging (e.g., to school, peers, or society) of the youth and mattering to significant others (Bowers et al., 2012; Erikson, 1968; Lerner et al., 2009). A mentoring relationship is characterized by a strong connection between an older or more experienced person who provides guidance and support to a younger or less-experienced person (Rhodes, 2002). The connection between an adolescent and a "natural mentor" can promote positive youth development and protect against the risks associated with the challenges of

adolescence (Bowers et al., 2015). To follow the (restrictive) preventive COVID-19 measures, it may help if there is an adult other than your parents whom you can ask for advice and support. Such a trusted person may be able to offer an additional perspective on why social distance is useful and offer support to keep distance (Remie & Veldhuis, 2020).

## 1.4 | Coping

Research by Teasdale et al. (2011) shows that coping is a very important and still insufficiently researched predictor of human behavior in pandemics. More specifically, it was found that self-experienced competence (i.e., expectations people have about their own skills) was the most important coping mechanism to comply with measures. In general, task-oriented coping is considered to be related to positive adjustment in adolescents (Hampel & Petermann, 2006), which is associated with low levels of anxiety (Taha et al., 2013). This might partly explain why relatively lower levels of anxiety (and depression) proved to be associated with adherence to prevention measures during the initial stage of the 2019 coronavirus disease (Wang et al., 2020). Task-oriented coping is also positively associated with resilience (Campbell-Sills et al., 2006).

## 1.5 | Mental health problems

Not every young person has adequate coping strategies, sufficient resilience, or access to a natural mentor to deal with the challenges of the COVID-19 pandemic. For youth with mental health problems, the outbreak of a pandemic can aggravate their problems, developing increased levels of anxiety and depression. The effect of this may be that health-promoting measures, including the COVID-19 measures, will not be followed, because adolescents no longer make an effort to keep themselves healthy (Naeem et al., 2020). Also, youth with mental health problems might experience additional stress from following the preventive measures, worsening their mental health problems (Chatterjee et al., 2020), subsequently creating an extra barrier to obeying rules and preventive measures. Moreover, youth without mental health problems also showed an increase in mental health symptoms during COVID-19 (Nivettete et al., 2021), possibly having negative consequences for obeying preventive measures too, in particular, if mental health symptoms, such as antisocial behavior, emerge (Nivettete et al. 2021) or if mental health problems would have a negative effect on self-control (van Rooij et al., 2020).

## 1.6 | Current study

The aim of this study is to find factors that may influence whether youth adhere to COVID-19 (restrictive) preventive measures. First, resilient youth are expected to better adhere to the COVID-19 measures. Second, youth are expected to comply more with measures when they have access to a natural mentor. Third, youth are expected to comply more with measures when they have active (i.e., task-oriented) coping strategies. Finally, it is expected that the absence of psychological problems is positively associated with compliance with the measures.

## 2 | METHODS

### 2.1 | Sample

The sample consisted of  $N = 263$  youth (80% female) between the ages of 16 and 24 ( $M = 21.1$  years;  $SD = 2.44$  years). Of the total number of respondents, 96.6% had a Caucasian White background. The vast majority of the

respondents attended higher education (83.3%). At the time of the COVID-19 crisis, a total of 71.5% of this group of respondents were still able to follow education (54% online, 17.5% through self-study). Most youths complied with the preventive measures (84.8%), such as washing their hands frequently, and 85.9% followed the rules pertaining to social distancing.

## 2.2 | Procedure

The current exploratory study was approved by the ethics committee of the Faculty of Social and Behavioral Sciences of the University of Amsterdam (2020-CDE-12058). Participants were recruited through social media channels, the radio, and the website of the University of Amsterdam. Participation in the study was voluntary, and no reward was obtained for participation. Participants could participate in the study using a link which led to the questionnaire. The questionnaire was made and shared using Qualtrics. Participants had 14 days to enroll in the study and finish the questionnaire. The data was gathered during the first wave of the COVID-19 virus outbreak, and the first week of the lockdown.

## 2.3 | Instruments

The respondents were asked about their mental health, degree of resilience, and how they cope with stressful situations by means of standardized and validated questionnaires. In addition, questions were asked about demographics (gender, age, education level, and nationality), current daily activities (school, study, and work), natural mentoring, and compliance with the (restrictive) preventive measures to combat the COVID-19 virus. The entire questionnaire was in Dutch, using the Dutch translations of the standardized questionnaires.

### 2.3.1 | Symptom Checklist-27 (SCL-27)

Mental health was assessed with SCL-27, an abbreviated version of the SCL-90-R (Derogatis, 1992). It is a multidimensional screening questionnaire for mental health problems. The SCL-27 contains 27 items, divided over six scales, namely, depressive symptoms, dysthymic symptoms, physical symptoms, symptoms of agoraphobia, symptoms of social phobia, and symptoms of distrust. The SCL-27 also contains a global severity index (GSI-27; Hardt et al., 2011). The SCL-27 was validated in a sample of  $N = 400$  Polish and German students (Hardt et al., 2011). The reliabilities were generally satisfactory ( $\alpha > 0.70$ ). In the current study, the "physical symptoms" scale had the lowest reliability ( $\alpha = 0.74$ ), whereas the highest reliability was found for the 'symptoms of social phobia' scale ( $\alpha = 0.83$ ).

### 2.3.2 | Child and Youth Resilience Measure-12 (CYRM-12)

Resilience was assessed using CYRM-12, an abbreviated version of the CYRM-28 (Liebenberg et al., 2013). The CYRM-12 contains 12 items (three scales) that measure individual capabilities/resources, relationships with primary caregivers, and contextual factors that facilitate a sense of belonging. The study by Koning et al. (2021) established the validity and reliability of the Dutch translation of CYRM-12. Internal structure, reliability, concurrent validity, and measurement invariance for gender and education level were examined in a sample of mainly Dutch Caucasian White adolescents ( $N = 763$ ). Reliability was satisfactory ( $\alpha = 0.77$ ). The high negative association between resilience (CYRM-12) and psychopathology (SCL-90-R) was considered indicative of criterion validity. The

results of this study imply that the CYRM-12 is a reliable and valid instrument for measuring resilience among Dutch adolescents and young adults. In the present study, Cronbach's  $\alpha$  was 0.80.

### 2.3.3 | Coping Inventory for Stressful Situations-21 (CISS-21)

Coping strategy was assessed using CISS-21, an abbreviated version of the CISS (Endler & Parker, 1999). This questionnaire measures coping strategies in terms of emotion-oriented, task-oriented, and avoidance coping. The CISS-21 is a valid and reliable instrument to assess coping strategies in adolescents from Turkey and India (Boysan, 2012; Golpelwar 2014). The reliability was acceptable for all subscales in both of these studies ( $\alpha > 0.70$ ). The scales "task-oriented coping" ( $\alpha = 0.77$ ) and "emotion-oriented coping" ( $\alpha = 0.83$ ) showed good reliabilities in the current study; In contrast, "avoidance coping" showed sufficient reliability ( $\alpha = 0.62$ ).

### 2.3.4 | Natural mentoring

A total of eight questions were asked to assess the availability of a natural mentor, and the quality of relationship with this person. Some examples of items were: "In addition to your parents, do you have someone you trust, and who you turn to for advice? If so, who is this person? (e.g., a friend, family member, sports coach, etc.);" and "How would you rate the bond with this person (very weak; weak; moderate; strong; very strong)."

### 2.3.5 | Preventive COVID-19 measures

Respondents were asked about the extent to which they followed the (restrictive) preventive measures to combat COVID-19 on a 5-point Likert scale ranging from "not at all" to "completely." A principal component analysis, with a forced one-factor solution, yielded a reliable scale (nine items, Cronbach's  $\alpha = 0.66$ ), which explained 29% of the variance: "I cough/sneeze on the inside of the elbow" had the lowest factor loading (0.35), and "I keep a minimum distance of five feet from other people" had the highest factor loading (0.67). We found support for a reliable "social distance" subscale (four items; Cronbach's  $\alpha = 0.67$ ) in a principal component analysis, with a forced one-factor solution, explaining 51% of the variance. The item "I stay at home as much as possible" showed the highest factor loading (0.65), followed by "I avoid social gatherings" (0.55), "If I experienced complaints, I would stay at home and don't go out" (0.43), and "I keep at least five feet away from other people" (0.41).

## 2.4 | Statistical analyses

First, preliminary analyses were performed in SPSS (Statistical Package for Social Scientists, version 24) to examine the correlations between resilience, natural mentorship, coping, and psychological problems. Subsequently, it was investigated which correlations exist between resilience, natural mentorship, coping, and psychological problems on the one hand and compliance with the COVID-19 measures on the other hand. If there was clarity about the direction of associations, correlations were tested one-sided. Finally, a multiple regression analysis was performed to determine which factors were unique predictors of adherence to the measures, controlling for both sex and age as well as possible moderation effects by testing the interactions between sex/age and all significant predictors after standardization of the continuous variables.

### 3 | RESULTS

Table 1 shows the results of the preliminary analysis, where we analyzed the correlations between psychological complaints (outcome measure) and the predictors resilience, natural mentorship, and coping. Only “avoidance coping” showed no significant correlation with psychological complaints ( $r = -0.063$ , ns). “Resilience” ( $r = -0.581$ ,  $p < 0.001$ ) and “emotion-focused coping” ( $r = 0.619$ ,  $p < 0.001$ ) showed strong correlations with psychological symptoms. Greater resilience proved to be associated with fewer psychological symptoms. Adolescents with an emotion-oriented coping strategy experienced more psychological symptoms. Weak negative correlations were found for the presence of a natural mentor ( $r = -0.157$ ,  $p < 0.001$ ), quality of the relationship with the natural mentor ( $r = -0.147$ ,  $p < 0.001$ ), and task-oriented coping ( $r = -0.278$ ,  $p < 0.001$ ), which indicated that the presence of a natural mentor, a higher quality of the relationship with this mentor and task-oriented coping were related to fewer psychological symptoms.

Table 2 shows the correlations between natural mentorship, resilience, coping, psychological symptoms on the one hand and adherence to the measures, including in particular maintaining social distance, on the other hand. Both general compliance with COVID-19 measures as well as compliance with specifically social distancing measures were examined. Psychological symptoms were found to be negatively related at trend level to following the COVID-19 measures ( $r = -0.080$ ,  $p < 0.10$ ) and maintaining social distance ( $r = -0.081$ ,  $p < 0.10$ ), which indicated adolescents with psychological symptoms adhered less to the COVID-19 measures. Depressive symptoms ( $r = -0.101$ ,  $p < 0.10$  and  $r = -0.122$ ,  $p < 0.05$ ) and distrust ( $r = -0.135$  and  $-0.151$ ,  $p < 0.05$ ) were significantly and negatively associated with adhering to measures and maintaining social distance (the relation between depression and adherence to measures at trend level).

Resilience was found to be significantly and positively associated with adherence to measures ( $r = 0.237$ ;  $p < 0.001$ ) and maintaining social distance in particular ( $r = 0.184$ ;  $p < 0.001$ ). This implies that greater resilience was related to compliance with COVID-19 measures and maintaining social distance. Natural mentorship turned out to be positively associated with adherence to measures ( $r = 0.177$ ;  $p < 0.01$ ) and maintaining social distance ( $r = 0.197$ ;  $p < 0.001$ ). Notably, also quality of the relationship with the natural mentor was positively associated with adherence to measures ( $r = 0.117$ ,  $p < 0.05$ ) and maintaining social distance ( $r = 0.122$ ;  $p < 0.05$ ). Task-oriented coping proved to be significantly associated with adherence to measures ( $r = 0.154$ ;  $p < 0.05$ ) and just failed to reach significance with maintaining social distance ( $r = 0.081$ ;  $p < 0.10$ ).

In summary, the (trend) significant correlations between the different predictors of compliance with the COVID-19 measures, including maintaining social distance, were weak to very weak.

Finally, a multiple regression analysis was performed on all significant predictors of COVID-19 measures, which yielded a significant regression equation:  $F(6, 243)$ ,  $3.474$ ;  $p = 0.003$ ;  $R^2 = 0.281$ , with resilience as a unique predictor ( $\beta = 0.188$ ;  $t = 2, 242$ ;  $p = 0.026$ ). In addition, the regression equation for social distancing was also

**TABLE 1** Correlations between the predictors resilience, natural mentorship, and coping and the outcome measure psychological complaints ( $N = 263$ )

Predictors	Pearson correlation ( $r$ )	Significance ( $p$ )
Resilience	-0.58	<0.001
Presence natural mentor	-0.16	0.006
Quality relationship natural mentor	-0.15	0.010
Task-oriented coping	-0.28	<0.001
Emotion-oriented coping	0.62	<0.001
Avoidance coping	-0.06	0.153

**TABLE 2** The relation between predictors and COVID-19 measures

Predictors	Measures		Social distancing	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Total psychological symptoms	-0.08	0.099	-0.08	0.096
Depressive symptoms	-0.10	0.052	-0.12	0.024
Dysthymic symptoms	-0.06	0.171	-0.03	0.317
Somatic symptoms	-0.05	0.209	-0.04	0.245
Agoraphobic symptoms	0.02	0.353	0.02	0.377
Social phobia symptoms	-0.07	0.131	-0.08	0.114
Distrust	-0.14	0.015	-0.15	0.007
Resilience	0.24	<0.001	0.18	0.001
Presence of a natural mentor	0.18	0.002	0.20	0.001
Quality relationship natural mentor	0.12	0.032	0.12	0.027
Task-oriented coping	0.15	0.006	0.08	0.094
Emotion-oriented coping	-0.04	0.253	-0.01	0.443
Avoidance coping	-0.05	0.220	-0.06	0.150

Note:  $N = 263$ . The COVID-19 measures have been separated into two measures: COVID-19 measures in total (column "Measures") and a subscale of social distancing measures (column "Social distancing").

significant:  $F(6, 243), 2.715; p = 0.014; R^2 = 0.251$ , with natural mentorship as a unique predictor ( $\beta = 0.147; t = 2, 228; p = 0.027$ ). We did not find significant moderator effects (results are available upon request).

## 4 | DISCUSSION

The purpose of this study was to examine factors that contribute to adherence to the COVID-19 measures in youth. Youth who comply with the social distance measures have fewer depressive symptoms, are less suspicious of others, are more resilient, more often have a natural mentor, and deal with their problems in a more active way. These factors were not moderated by age and gender. In total, 84.8% of the respondents did adhere to the measures and 85.9% followed the rules pertaining to social isolation. These high percentages may point to a ceiling effect, which may partly explain why the identified associations were relatively weak.

The weak associations found in this study do not make the results less important, as the success of policies to contain the virus outbreak depends on the degree to which everyone adheres to the measures. After all, with a high reproduction number ( $R$ , i.e., the number of people that one infected person will pass on a virus to, on average), specific small groups of people who ignore the measures can cause major problems. The reproduction number depends not only on the characteristics of the virus but also on the characteristics of the population, including factors that determine whether or not people adhere to the preventive measures (van Loon, 2020).

On the basis of the results of this study, some recommendations can be made for the government's prevention policy for reducing the spread of COVID-19. First, it is important to offer youth sufficient and understandable information about COVID-19, taking into account that mistrust may interfere with governmental campaigns aimed at guiding a population towards the desired behavior (Liao et al., 2010; Nivette et al. 2021). This effect may be related to epistemic trust, that is, the willingness to consider information as trustworthy and relevant. Epistemic

trust increases when the informant is an acquaintance or someone relatively close to the children and adolescents (Eaves & Shafto, 2016). In this case, information provided by the government may only be considered relevant when important persons in the lives of the young people, such as their parents or natural mentors, encourage adherence to the COVID-19 measures (Liao et al., 2010). Besides providing sufficient and understandable information, governments should take into account the messenger: Who delivers the information and how can governments collaborate with people trusted by youth? We recommend that the government encourages natural mentors to keep in touch with youth during a pandemic and supports them in coping with the challenges of a pandemic. When youth experience mental health problems that make them unable to get their lives on track during a pandemic, which may also make it difficult to adhere to preventive measures, they can be encouraged to actively select a natural mentor from their social environment through youth-initiated mentoring program, showing promising results in a recent meta-analysis (van Dam et al., 2021). Research by Zhong et al. (2020) shows that more knowledge about COVID-19 is associated with a lower chance of negative attitudes and inappropriate behavior. This suggests that health education programs aimed at improving COVID-19 knowledge may be useful in fostering and maintaining safe practices. Our study results indicate that a precondition is that youth have the coping skills and resilience to deal with the COVID-19 problems and adhere to the measures.

Research shows that it is crucial to take cultural and socioeconomic factors into account when designing interventions to promote resilience in times of crisis, because the resilience of citizens is inextricably linked to the resilience of their community, in particular the community's ability to care for its most vulnerable members (Ungar, 2011). In this sense, it seems important that youth policy during the COVID-19 crisis focuses on strengthening social support, whereby cultural aspects and socioeconomic factors are included in the design and implementation of preventive COVID-19 measures.

It is important to offer support to youth with psychological complaints during the COVID-19 pandemic (and afterward), as our study showed that measures were followed less often by youth suffering from psychological complaints. However, it should be noted that the sample of our study mainly comprised Caucasian and female youth attending higher education. From previous research, it is known that female gender and attending higher education is associated with more compliance with preventive measures during a pandemic (Bish & Michie, 2010), including the COVID-19 crisis (Brouard et al., 2020). In light of this knowledge, our sample was representative of the population of youth to a limited extent.

Research shows that youth are at greater risk for psychological complaints as a result of a pandemic outbreak (Sim et al., 2010). Many adolescents suffer from severe loneliness, which can have negative consequences for their (mental) health, general wellbeing, and development (Landman, 2020). Especially adolescents with depression and anxiety tend to suffer from loneliness (Blanco, 2020). A negative spiral could easily arise between an increase in psychological complaints and compliance with measures. Results of the current study suggest that especially depressive symptoms require attention.

Adjustments are necessary for youth with psychological complaints. First, it is important to understand the emotional responses resulting from a pandemic, such as anxiety, depression, physical complaints, and loss of control. Second, it is important that youth have timely access to practical information about the outbreak of the virus to reduce uncertainty. Third, it is important that social support networks be established or strengthened within society, especially for juveniles who do not single-handedly develop an adequate coping strategy and lack resilience (Sim et al., 2010).

When interpreting the results, a number of limitations of this study should be taken into account. First, the sample is not entirely representative of Dutch youth, as it was a sample of convenience, which contains an overrepresentation of female respondents of Dutch origin with a high level of education. Therefore, the results cannot be safely generalized to youth with a low educational level and migration background. Second, in addition to well-validated instruments (SCL-27, CYRM-12, and CISS-21), we used questionnaires that were especially developed for this study, in particular, to assess compliance with COVID-19 measures. Although their validity is unknown, the reliability of these questionnaires was sufficient. It should also be taken into account that this study

was cross-sectional. Therefore, no statements about causal relations can be made. Lastly, given the exploratory nature of our study, and to maintain adequate statistical power to identify weaker associations, it was decided not to perform a correction for repeated testing.

Future research should focus on factors that predict compliance of youth with measures that can prevent a (further) virus spread in a pandemic outbreak in the long term, in particular, because the success of these measures depends on the vast majority of youth that adheres to these measures. Notably, the longer the preventive measures must be adhered to, the less youth may be willing to comply with these measures due to their intrusiveness and possible negative effects on well-being and mental health. Therefore, future research should focus on the effects of these preventive measures on mental health, especially over an extended period of time. Finally, our study not only reveals how well Dutch youth comply with the preventive COVID-19 measures but also what factors contribute to compliance to these measures. It would be interesting to replicate our study during a potential subsequent COVID-19 wave or in other countries to establish whether our results are generalizable across time and place.

In view of the exponential growth of the COVID-19 virus spread, the present study examined factors that were assumed to be related to compliance with the preventive measures. The results of our study may be used to support youth in dealing with the COVID-19 crisis and shed light on what youth need to comply with the preventive measures. Youth with fewer depressive symptoms adhered better to measures of social distance. In addition, adolescents who were less suspicious and more resilient, as well as youth with an active coping strategy and those with a natural mentor more often complied with COVID-19 measures, independent of age and gender.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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