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Psychopathic traits predict lower adherence to COVID-19 containment measures

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ABSTRACT

Countries worldwide have implemented measures to contain the spread of COVID-19, and it is vital to understand which factors influence compliance to these measures. This study investigated whether psychopathic traits predict adherence to containment measures imposed by the UK government. 156 university students ($M_{\text{age}}=21$ years) completed an online survey measuring psychopathic traits (the Triarchic Psychopathy Measure), demographic variables, and participants' living situations, underlying health risks, contact with vulnerable people and fear of COVID-19. Hierarchical multiple regression indicated that higher psychopathic traits (particularly disinhibition) predicted lower adherence to containment measures when controlling for other variables. A mixed-model ANOVA analysing longitudinal data, collected during the second ($n=156$) and third ($n=118$) lockdowns, showed that this relationship was stable over time. Additionally, fear of COVID-19 predicted adherence and mediated the relationship between psychopathic traits and adherence. These findings highlight the relevance of psychopathic traits for understanding COVID-19-related behaviours, with implications for public health communication.

1. Introduction

The COVID-19 pandemic has led most countries to establish containment measures aiming to reduce transmission. These include encouraging increased hygiene, enforcing or recommending face coverings, placing restrictions on social interactions and travel, and establishing periods of lockdown, during which people must stay at home (WHO, 2021). Research conducted to date suggests that, among other individual differences, psychopathic traits may influence people's compliance or adherence to COVID-19 containment measures. The current study provides longitudinal evidence for this relationship among university students across two UK national lockdowns.

1.1. Psychopathy and health behaviours

Psychopathy is characterised by emotional-interpersonal detachment, involving a lack of empathy and guilt, grandiosity and manipulativeness, combined with behavioural deviancy, including impulsive and irresponsible traits (Frick & Marsee, 2018). Psychopathy is characterised by affective (e.g., lack of empathy and guilt, callousness), interpersonal (e.g., manipulativeness, social dominance), self-referential (e.g., grandiosity), and behavioural (e.g., impulsivity, irresponsibility, sensation-seeking) traits (Frick & Marsee, 2018). Although psychopaths have been viewed as a distinct group (e.g., evidenced by

a cut-off score on Hare's (2003) Psychopathy Checklist-Revised), evidence largely supports the conceptualisation of psychopathy as a dimensional construct, and as such, psychopathic traits appear to be continuously distributed in the general population (Neumann & Hare, 2008; Guay et al., 2007). Moreover, although psychopathy is sometimes referred to as a unitary construct, there is robust evidence for its multidimensionality (Sellbom & Drislane, 2020). While there is an ongoing debate about the optimal factor structure of the subdimensions of psychopathy, Patrick et al.'s (2009) triarchic conceptualisation of psychopathy is proposed to integrate the alternative historical accounts with empirical findings. The triarchic model encompasses three distinct constructs: boldness, meanness and disinhibition. *Boldness* is conceptualised as a fearless disposition, characterised by social dominance, emotional resilience and venturesomeness. *Meanness*, sometimes referred to as callousness-aggressiveness, entails deficient empathy, lack of social connectedness and exploitative behaviour. Finally, *disinhibition* reflects tendencies toward impulsiveness and irresponsibility, encompassing emotion dysregulation and deficient behavioural control. These constructs can be assessed in clinical and community samples using the Triarchic Psychopathy Measure (TriPM), a self-report questionnaire measure.

From these definitions, it becomes apparent how psychopathic traits, such as fearlessness, impulsiveness and irresponsibility, could lead an individual to make poor decisions regarding their own health and others'. Indeed, existing evidence shows that psychopathic traits are negatively

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correlated with health-promoting behaviours (e.g., sleeping enough, exercising), and positively correlated with unhealthy behaviours (e.g., substance use) and poorer health outcomes (e.g., increased risk of disease and injuries, lower life expectancy), even when controlling for associated sociodemographic variables (Malesza & Kaczmarek, 2019; Jonason et al., 2015). Psychopathic traits have also been implicated in a variety of public health problems, for example, they have been found to predict risky sexual behaviours (Benotsch et al., 2012; Hudek-Knezevic et al., 2007).

1.2. Psychopathy and health behaviours during the COVID-19 pandemic

Based on this research, it could be hypothesised that psychopathic traits may predispose people to behave in a way that puts them and others at risk during the COVID-19 pandemic. There is growing evidence for a relationship between adherence to containment measures and personality traits that include or are related to psychopathy. Namely, antisocial traits that overlap with psychopathic traits, or the Dark Triad, a constellation of psychopathy, Machiavellianism (e.g., manipulation and cynicism) and narcissism (e.g., entitlement and self-centeredness). Given the paucity of research in this area, studies looking at adherence to containment measures associated with these “dark” or antisocial personality traits more generally will be considered for comparative purposes. The studies published to date also vary in terms of their outcome variables, with some encompassing all COVID-19-related behaviour within a single item of adherence (e.g., expressed as a percentage), and others using questionnaires assessing different types of behaviours (e.g., hygiene, social distancing, breaking other containment measures). Despite the diversity in predictors and outcomes, research so far has been largely consistent in showing that ‘dark’ or antisocial personality traits predict lower adherence to containment measures.

For example, Miguel and colleagues (2021) used latent profile analysis to divide their sample of 1,578 Brazilian adults into those presenting an antisocial or empathic profile. They found that the two profiles significantly differed in adherence to containment measures including hygiene, face mask use and social distancing. Looking at the traits individually, higher levels of callousness, deceitfulness and risk-taking, and lower levels of affective resonance predicted lower adherence. The antisocial profile resembles the aforementioned triarchic construct of psychopathy, suggesting that psychopathic traits may influence adherence to containment measures.

Other researchers have used abbreviated measures of psychopathy or the psychopathy subscale of a Dark Triad measure. Blagov (2020) measured psychopathic traits using an abbreviated version of the TriPM as well as Dark Triad traits in 502 American adults. The adherence measure used included items assessing social distancing, hygiene and risky interpersonal contact during the pandemic. Results revealed that higher psychopathic traits were associated with endorsement of fewer social distancing and hygiene behaviours and more risky behaviours. Similarly, Zajenkowski and colleagues (2020) recruited a sample of 263 Polish adults and found that scoring higher in Dark Triad traits, including psychopathy, predicted lower compliance with COVID-related government restrictions. However, they used only a single item to assess compliance, expressed as a percentage. Nowak and colleagues (2020) also studied a Polish sample ($n=755$), but developed a 6-item measure of health behaviours (e.g., staying home, washing hands) and stockpiling of supplies during the COVID-19 pandemic. They found that higher Dark Triad traits correlated with fewer health behaviours and more stockpiling. Triberti and colleagues (2021) obtained similar results in an Italian sample ($n=465$), using a 16-item measure of adherence to lockdown. They found that psychopathy and Machiavellianism were negatively correlated with health behaviours and positively associated with ignoring lockdown measures.

Thus, evidence to date supports the role of ‘dark’ or antisocial traits in predicting lower adherence to COVID-19 containment measures. Psychopathic traits, in particular, are consistently hinted at as important

predictors of adherence, but this evidence derives from studies assessing closely related constructs (Dark Triad) or using abbreviated versions of existing psychopathy measures. In the present study, the use of the full version of the TriPM will provide a more valid and reliable measure of psychopathic traits and their subdimensions and allow the impact of these subdimensions to be studied in more detail.

1.3. The current study

There are various gaps in the literature that the current study aims to address. Firstly, these early findings warrant replication and extension, as the published research was conducted at the start of the pandemic, from about March to June 2020, when most countries were experiencing their first lockdowns. While these lockdowns were able to reduce rates of transmission, many governments continued to impose restrictions, as well as additional lockdown periods to contain new waves of infection. UK citizens refer to that initial period as the “first lockdown”, as it has been followed by two further national lockdowns. Thus, the current study investigated whether the relationship between psychopathic traits and adherence to containment measures extends to later stages of the pandemic. It is also the first to study this relationship in a UK sample.

In addition, research so far has been cross-sectional, whereas this study adopted a longitudinal design to allow the exploration of potential changes over time. Goldstein and colleagues (2021) evaluated data across 152 countries, reporting that extended lockdowns or new lockdowns introduced later in the pandemic exert, at best, an attenuated effect on reducing virus circulation and number of deaths. They describe a “lockdown fatigue” phenomenon which makes lockdowns hard to sustain economically and socially. Additionally, Nowak and colleagues (2020) proposed that individuals higher in dark or psychopathic traits might be particularly likely to show lockdown fatigue due to their proneness to boredom and heightened need for excitement and novelty, and consequently, show a more marked reduction in adherence over time. The current study was planned before it was known that there would be a second national lockdown in November 2020 or a third in January 2021, and it was expected that the two periods of data collection would differ in terms of restrictions and guidelines regarding health behaviours. The fact that the same containment measures were imposed during two separate national lockdowns allowed for a direct comparison between the two timepoints. Thus, the longitudinal design offers novel insights into how lockdown adherence varies over time, and whether psychopathic traits moderate this relationship.

Another novel aspect of this study is the focus on university students as opposed to a general population sample. Students have been identified as a key population at high risk for rapid transmission of disease, as exemplified by the yearly “freshers’ flu” among first-year students (“freshers”), but also other students, due to the mass movement to term-time addresses and increased social interactions (Pérez-Reche and Strachan, 2020). Additionally, younger adults have experienced less severe COVID-19 symptoms but more depression, loneliness and self-harm than older adults during the pandemic, with cross-cultural evidence for the decline in mental health for university students in particular (Odrizola-González et al., 2020; Cao et al., 2020; Huckins et al., 2020). Moreover, young people are more oriented towards immediate experiences and rewards and take more risks when they are with peers (Blakemore, 2018; Gardner et al., 2005). Thus, students face a higher risk of poor mental health outcomes than physical complications due to COVID-19 infection, and consequently may prioritise social interaction over adhering to COVID-19 safety measures. Indeed, evidence shows that young adults adhere less to containment measures than older adults (De La Vega et al., 2020; Solomou & Constantinidou, 2020). To combat this, the UK Scientific Advisory Group for Emergencies (SAGE) (2020) recommended emphasising social norms of adherence and a collective identity towards care for others, as well as raising awareness of the short-term risks of nonadherence for young people, including harm to others around them. However, if psychopathic traits predict lower adherence in this popula-

tion, then these interventions may be less effective, as those higher in psychopathic traits have lower levels of social connectedness and empathy. Hence, university students are a relevant population to focus on.

Lastly, only two studies controlled for important contextual and socio-demographic variables that may be expected to influence behaviour during the pandemic. Specifically, [Blagov \(2020\)](#) controlled for underlying health conditions that may make participants more vulnerable to COVID-19, and [Miguel et al. \(2021\)](#) controlled for participants having previously been diagnosed with COVID-19. Controlling for such variables is crucial to determine the unique contribution of psychopathic traits in predicting adherence. Hence, the current study controlled for several demographic/health-related factors that could influence lockdown adherence (e.g., living alone versus with clinically vulnerable family members). Also, fear regarding the consequences of catching or transmitting COVID-19 has been found to predict compliance to public health measures during the pandemic ([Harper et al., 2020](#)), and might also covary with psychopathic traits, particularly the fearlessness sub-dimension.

For the sake of transparency, we note that one of the original study aims was to investigate the relationship between psychopathic traits and risk of COVID-19 infection, but due to low rates of infection and the sample size achieved, it was not possible to address this aim. Consequently, the study included two additional measures which have been omitted from the main text. Nonetheless, the relevant measures and statistical analyses are described and reported in Supplementary Materials for the benefit of interested readers.

1.4. Aims and hypotheses

This study aimed to determine whether psychopathic traits predict adherence to COVID-19 containment measures in a UK university student sample. We hypothesised that higher levels of psychopathic traits would be associated with lower adherence to COVID-19 containment measures. We investigated whether any of the three psychopathy sub-dimensions – namely boldness, meanness and disinhibition – were particularly influential in explaining variance in adherence to containment measures. We also aimed to explore whether psychopathic traits influence lockdown fatigue by collecting data at two timepoints, hypothesising that psychopathic traits would be related to poorer adherence over time.

2. Method

2.1. Participants

Participants were recruited via opportunity sampling, using social media sites including Facebook, Instagram and LinkedIn, emails to student research participation emailing lists, and noticeboard flyers. The inclusion criteria were that they currently be students at a UK university and aged 18 to 30.

186 participants were recruited at Time 1. After excluding incomplete surveys, the completion rate was 83.9% ($N = 156$, 62.8% females, mean age 20.96, $SD = 1.97$). 118 participants completed the survey at Time 2 (68.1% females, mean age 21.20, $SD = 1.96$), approximately 2-3 months later, thus the retention rate was 76.3%. Participants were students from 15 universities across the UK. One or more psychiatric diagnoses were reported by 16.7% of the sample at Time 1 and 15.1% at Time 2; anxiety and depression being the most common.

2.2. Materials and procedure

The surveys were generated using Qualtrics survey software and distributed through online links and a QR code. Participants were provided with information about the study and gave informed consent before starting the survey. They were also informed of their right to withdraw by closing their web browser during the survey. The embedded data

function on Qualtrics was used to assign each participant a random ID number so that their data could be linked across the two surveys anonymously. Participants were asked to provide an email address after completing the first survey so that they could be sent the survey link at Time 2. Each survey ended with a debrief: a short debrief at Time 1, then a full debrief at Time 2, explaining that psychopathic traits were assessed and reassuring participants that these traits occur on a spectrum, that the measures are not diagnostic, and that the sample was recruited randomly, not selected for their psychopathic traits. Aftercare resources were provided. Participants were entered in a prize draw for a £20 Amazon gift voucher when data collection was completed, after which only anonymised data were retained and analysed.

The first period of data collection, Time 1, took place during the second national lockdown (December 2020), and Time 2 occurred during the third lockdown (February 2021). The survey was similar each time, except for the demographic and psychopathic traits measures, which were omitted at Time 2, because these dispositional variables were not expected to vary over this time interval, given evidence of the TriPM's high internal and test-retest reliability ([Blagov et al., 2015](#); [Van Dongen et al., 2017](#)).

Demographic, Student Status and Clinical Variables (Time 1 only)

Participants reported their age, sex, university, year of study and whether they had ever been diagnosed with a psychiatric disorder.

COVID-19-Related Variables (Times 1 & 2)

2.2.1. Living situation

Participants were given 5 options (e.g., “in student accommodation on campus”) or asked to specify “other”; answers were coded into three categories: (1) living alone, (2) living with others (students/friends/partner), (3) living with family.

Underlying health condition(s):

Participants selected yes/no in response to “Do you have any underlying health conditions that make you more vulnerable to COVID-19?”

2.2.2. Contact with vulnerable people

Participants selected yes/no in response to “Do you currently live with or come into frequent close contact with anyone who is more vulnerable to COVID-19 (aged 70+, underlying health condition, etc.)?”

2.2.3. Fear of COVID-19

This measure included 5 items assessing fear or concern about contracting or transmitting COVID-19 (e.g., “I am afraid of catching COVID-19”) on a 4-point Likert scale scored 0-3: “false”, “mostly false”, “mostly true”, and “true”. The measure was reliable with Cronbach's $\alpha = .784$ at Time 1 and $\alpha = .782$ at Time 2.

Triarchic Psychopathy Measure (TriPM) (Time 1 only)

Psychopathic traits were measured with [Patrick's \(2010\)](#) TriPM, which contains 58 items scored on a 4-point scale (“false”, “mostly false”, “mostly true”, and “true”) and contains Boldness (19 items), Meanness (19 items) and Disinhibition subscales (20 items). Example items include “I'm afraid of far fewer things than most people”, “I don't have much sympathy for people” and “I often act on immediate needs”. Items are scored from 0-3 and summed to yield an overall score, together with scores for each subscale. Reliability of the TriPM was acceptable at both Time 1, $\alpha = .752$, and for the subsample with data available at Time 2, $\alpha = .744$.

Lockdown Adherence (Times 1 & 2)

This part of the study included 18 items based on the UK national lockdown restrictions and general public health guidelines. Participants rated how likely they were to carry out each behaviour on a 5-point scale from extremely unlikely (0) to extremely likely (4), where a higher score indicates higher levels of adherence (ranging from 0-72). Four items were reverse-scored. Example items include “avoiding meeting people I do not live with” and “stay at home unless permitted by law” (reverse-scored). The measure is available in the Supplementary Materials.

The measure was subjected to principal axis factoring to determine whether the measure could be reduced to a few factors, similarly to Blagov (2020), who separated his “health behaviour” scale into “social distancing”, “hygiene” and “venturous behaviour”. The data appeared suitable for factor analysis, according to the Kaiser-Meyer-Olkin test value of .79 and Bartlett’s test of sphericity reaching statistical significance, $p < .001$. Eigenvalues greater than 1 and inspection of the scree plot indicated that 2 to 5 factors could be extracted. However, the items did not load strongly onto the factors extracted, nor did they form coherent factors that could be explained by any underlying construct, so Lockdown Adherence was kept as a single construct. The measure was reliable, with $\alpha = .880$ at Time 1 and $\alpha = .884$ at Time 2.

2.3. Data analysis

For the primary hypothesis, hierarchical multiple regression models were constructed to predict adherence to containment measures (Times 1 and 2 separately). Variables were entered in three blocks: (1) demographic variables; (2) COVID-19-related variables; (3) psychopathic traits. This was done to control for demographic variables and evaluate the unique contributions of variables expected to affect adherence and of psychopathic traits, respectively. Models were constructed using the overall TriPM score and separately using the Boldness, Meanness and Disinhibition subscale scores, to assess whether these psychopathy subdimensions are differentially related to adherence. Bonferroni correction was applied to control for multiple testing by dividing the alpha level by four (as we ran four regression analyses), yielding a corrected p value of 0.0125. Critically, all the key findings were below this corrected threshold.

The longitudinal data were analysed using a 2×2 mixed-model ANOVA to evaluate whether the relationship between psychopathic traits and adherence differs over time, with time as within-subjects factor and psychopathy score as between-subjects factor (“high” or “low” TriPM scores, using the median of 52 as a cut-off).

3. Results

3.1. Descriptive results

Descriptive statistics for each measure are presented in Table 1. The sample were mostly female and undergraduate students; the majority lived with other students but between 21-28% lived with family; only about 7-8% had underlying health conditions that made them vulnerable to COVID-19, whereas about 21-25% were in close contact with vulnerable people. Both fear of COVID-19 and adherence to containment measures were relatively high in this sample, with a mean score of about 11/15 and 52/72, respectively; mean TriPM scores were comparable to those reported previously in community samples (Paiva et al., 2020; Van Dongen et al., 2017).

3.2. Predicting adherence to lockdown

Table 2 shows the results of the regressions predicting adherence to lockdown at each time from demographic variables, COVID-19-related variables and overall TriPM score. The models significantly predicted adherence to lockdown at both Time 1, $F(9, 154) = 13.62, p < .001$, and Time 2, $F(9, 117) = 7.46, p < .001$. The models were similar at both time points, except for the variables at Time 2 accounting for less variance in the outcome. Therefore, the Time 1 regression analysis is covered in more detail.

The demographic variables explained 18.7% variance in adherence to lockdown, although only age and sex were significant predictors, whereby older participants and females adhered more. COVID-19-related variables accounted for a further 18.6% variance, with fear of COVID-19 an important predictor. Finally, TriPM score accounted for an additional 8.5% variance, with higher psychopathic traits predicting

Table 1
Descriptive statistics for demographic variables, COVID-19-related variables, psychopathic traits and measures of adherence

	Time 1 (N = 156)	Time 2 (N = 118)
Demographic variables		
Age ^a [18-28]	20.96 (1.97)	21.22 (1.96)
Sex (female) ^b	98 (62.8%)	80 (67.8%)
Psychiatric diagnosis (yes) ^b	26 (16.7%)	18 (15.3%)
Year of study		
First year undergraduate ^b	10 (6.4%)	16 (13.6%)
Second year undergraduate ^b	32 (20.5%)	23 (19.5%)
Placement year ^b	37 (23.7%)	28 (23.7%)
Final year undergraduate ^b	51 (32.7%)	42 (35.6%)
Postgraduate ^b	26 (16.7%)	9 (7.6%)
COVID-19-Related Variables		
Living situation		
Living alone ^b	3 (1.9%)	4 (3.4%)
Living with other students ^b	120 (76.9%)	81 (68.6%)
Living with family ^b	33 (21.2%)	33 (28.0%)
Underlying health condition(s) (yes) ^b	11 (7.1%)	9 (7.6%)
Contact with vulnerable people (yes) ^b	33 (21.2%)	29 (24.6%)
Fear of COVID-19 ^a [0-15]	11.07 (3.07)	11.04 (2.81)
Triarchic Psychopathy Measure (TriPM)		
Overall ^a [16-130]	55.28 (19.97)	53.00 (19.51)
Boldness ^a [3-57]	29.33 (9.73)	29.01 (9.86)
Meanness ^a [0-47]	11.60 (8.99)	10.52 (8.15)
Disinhibition ^a [2-37]	14.20 (7.57)	13.35 (7.31)
Adherence to lockdown ^a [17-72]	52.16 (12.39)	52.75 (11.60)

^a [Range] Mean (SD).

^b Number of participants (%).

Table 2

Hierarchical multiple regressions predicting adherence to containment measures at Times 1 and 2 from overall TriPM score

Predictor variable	Time 1 (N = 156)	Time 2 (N = 118)
Step 1 R ²	.187***	.098*
Age	.321**	.185*
Sex	.295***	.252**
Psychiatric diagnosis	.033	-.061
Year of study	-.086	-.075
Step 2 ΔR ²	.186***	.204***
Step 2 R ²	.373***	.302***
Age	.224*	.133
Sex	.213**	.224**
Psychiatric diagnosis	.004	-.034
Year of study	-.062	-.051
Living situation	.007	.145
Underlying health conditions	.054	.126
Contact with vulnerable people	-.025	.048
Fear of COVID-19	.443***	.353***
Step 3 ΔR ²	.085***	.082***
Step 3 R ²	.458***	.383***
Age	.233**	.142
Sex	.055	.126
Psychiatric diagnosis	-.057	-.080
Year of study	-.097	-.082
Living situation	.086	.126
Underlying health conditions	.038	.126
Contact with vulnerable people	-.044	.063
Fear of COVID-19	.365***	.285**
Psychopathic traits (TriPM)	-.363***	-.319***

* $p < .05$, ** $p < .01$, *** $p < .001$

lower adherence. The final model predicted 45.8% variance in lockdown adherence.

The hierarchical regression model with separate Boldness, Meanness and Disinhibition subscale scores was significant at both Time 1, $F(11, 154) = 11.79, p < .001$, and Time 2, $F(11, 117) = 7.10, p < .001$. The unique variance in adherence explained by the subscales was 10.3% and 12.2% at Times 1 and 2, respectively. However, only Disinhibition was a significant predictor of adherence at Time 1 ($p < .01$) and 2 ($p < .001$),

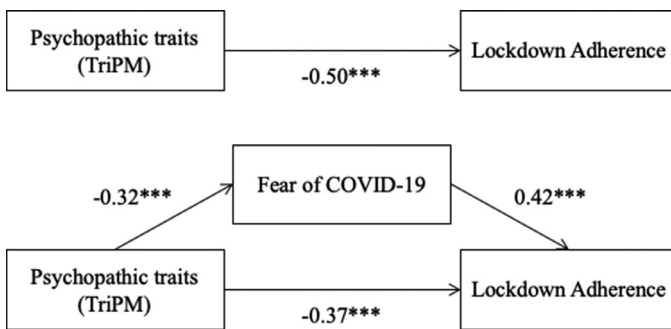


Fig. 1. Path models displaying standardized regression coefficients. Top: total effect of psychopathic traits on lockdown adherence. Bottom: the relationship between psychopathic traits and adherence to lockdown as mediated by fear of COVID-19. *** $p < .001$

with higher disinhibition predicting lower adherence (see Supplementary Materials for a complete description of these findings).

Given that fear of COVID-19 predicted lockdown adherence and fear of COVID-19 was negatively correlated with psychopathic traits, an exploratory mediation analysis was conducted to test whether the effect of psychopathic traits on adherence to lockdown was mediated by fear of COVID-19, using data from Time 1. The PROCESS procedure v3.5.3 developed for SPSS (Hayes, 2018) was used to test for mediation effects, using 1000 bootstrapped samples. Significant mediation occurs if the 95% bias-corrected confidence intervals for the indirect effect do not include zero (Preacher & Hayes, 2008). The mediation analysis revealed a significant indirect effect of overall TriPM score on adherence to lockdown through fear of COVID-19, $ab = -0.08$, 95% BCa CI [-0.13, -0.04], as illustrated in Figure 1. The mediator accounted for 36.5% of the total effect, while the completely standardized indirect effect was -0.13, [-.21, -.07]. Mediation through fear of COVID-19 was also evident for boldness, $ab = -0.16$, [-0.26, -0.06], and meanness, $ab = -0.19$, [-0.31, -0.10], but not for disinhibition $ab = -0.10$, [-0.24, 0.04]. Path models for the mediation analysis for individual TriPM subscales are presented in Supplementary Materials.

3.3. Longitudinal analysis

The mixed-model ANOVA showed that the relationship between adherence and psychopathic traits did not differ over time. The main effect of TriPM score was significant $F(1, 117) = 18.96$, $p < .001$, $\eta^2 = .139$, indicating that low scorers showed consistently higher adherence to lockdown ($M = 56.63$, $SEM = 1.29$) than high scorers ($M = 48.15$, $SEM = 1.46$). However, the main effect of time was not significant $F(1, 117) = 0.77$, $p = .381$, $\eta^2 = .007$, with no difference in adherence between Times 1 and 2 ($M = 52.74$ and 52.05 , respectively). Critically, there was no significant time \times TriPM interaction $F(1, 117) = 1.75$, $p = .188$, $\eta^2 = .015$, contrary to our hypothesis that high scorers would show greater lockdown fatigue. The effect size for the difference in adherence scores between the high and low TriPM scorers was computed for Time 1 (where the sample size was greatest), indicating a large effect, Cohen's $d = 0.93$.

4. Discussion

This study examined the role of psychopathic traits in predicting adherence to containment measures imposed by the UK government. Supporting our primary hypothesis, higher levels of psychopathic traits, and disinhibition in particular, were associated with lower adherence to lockdown. However, this did not vary over time (from the second to the third UK lockdown), contrary to our hypothesis that psychopathic traits would be related to poorer adherence over time. Additionally, fear of COVID-19 was identified as a mediator of the effect of psychopathic traits on adherence.

The finding that higher psychopathic traits are associated with lower adherence to lockdown measures support those of the studies conducted in the early months of the pandemic (Miguel et al., 2021; Blagov, 2020; Zajenkowski et al., 2020; Nowak et al., 2020; Triberti et al., 2021), extending them to the contexts of the second and third UK lockdowns and a university student population. Both age and sex were significant predictors of adherence, in line with findings that young males are less likely to comply with containment measures than other groups (De La Vega et al., 2020; Solomou & Constantinidou, 2020). Nevertheless, psychopathic traits remained a significant predictor of adherence when all other variables were controlled for, accounting for 8.5% and 8.2% of variance (at Times 1 and 2, respectively) beyond demographic variables and COVID-19-related variables. Furthermore, the difference in adherence score between high and low TriPM scorers had a large effect size ($d = 0.93$), as well as being statistically significant. Aside from fear of COVID-19, none of the factors expected to influence adherence were found to be significant. It should be noted that adherence was generally quite high across the sample (the average score was 52 out of 72), attributable to all participants being under government-imposed lockdown. It appears that contextual factors, such as who participants live with or frequently come into contact with, as well as their vulnerability to COVID-19, do not influence adherence to restrictions, compared to dispositional (psychopathic traits) or emotional (fear of COVID-19) factors – at least in the present sample.

In fact, fear of COVID-19 was not only found to be a significant predictor of adherence, but also a mediator of the psychopathic traits-adherence relationship, accounting for 36.5% of the total effect. This extends research showing that fear of COVID-19 is a significant predictor of public health compliance (Harper et al., 2020), and highlights how diminished fear of COVID-19 contributes to the low adherence displayed by individuals higher in psychopathic traits. Furthermore, the mediation analyses demonstrated that fear of COVID-19 mediated the relationship between psychopathic traits and adherence in the case of the overall TriPM, and the boldness and meanness, but not disinhibition scores. The relationship between low fear of COVID-19 and boldness and meanness, but not disinhibition, is supported by recent findings showing that only boldness and meanness are associated with low perceived dangerousness of COVID-19 and low perceived susceptibility to infection (Sica et al., 2021). In the case of boldness, this association might be due to traits like fearlessness and threat insensitivity, whereas for meanness, social detachment and emotional insensitivity could limit recognition and concern over the potentially severe consequences of COVID-19 for others. Additionally, these findings can explain why disinhibition differs from the other subdimensions in that it predicts adherence even after controlling for fear of COVID-19, in line with previous observations that only disinhibition predicted adherence to social distancing guidelines (Blagov, 2020). Thus, it seems that disinhibition predicts adherence independently from the influence of fear, whereas the effects of boldness and meanness are mediated by fear of COVID-19.

The present study also showed that the effects of psychopathic traits on adherence were stable over time. Overall adherence rates did not change from Time 1 to 2, providing no evidence for “lockdown fatigue” in this sample. Critically, there was no interaction between psychopathic traits and time on adherence, which suggests that, at least within the timeframe studied here, individuals high in psychopathic traits are not more susceptible to “lockdown fatigue” than those who are lower in psychopathic traits. However, it remains to be seen whether this would still be the case if future lockdowns were implemented, as epidemiological and predictive models suggest that further lockdowns could reduce adherence levels (Goldstein et al., 2021).

4.1. Implications

The role of psychopathic traits in predicting adherence has broader consequences for the transmission of COVID-19, evidenced by the effectiveness of containment measures on reducing COVID-19 transmis-

sion worldwide (Haug et al., 2020; Mégarbane et al., 2021). Hence, the present findings have practical implications for the design of public health campaigns promoting adherence to containment measures. For student populations in particular, the recommended messages appealing to collective identity and empathy for others around them (SAGE, 2020) may be less effective in those who are higher in psychopathic traits. Instead, messages centred around preserving one's own freedoms or returning to their pre-COVID-19 lifestyle might appeal more to this subgroup than messages requesting compassion and cooperation. Furthermore, earlier research found that psychopathic individuals scored lower than controls on intentions to comply with public health practices in response to messages emphasising effective protective and coping responses (Self and Rogers, 1990). However, they did not differ in response to messages emphasising threat severity and the participants' vulnerability to it. In line with Quay's (1965) theory that psychopaths have lower basal arousal levels, they suggest that high-threat communication may provide the arousal required to induce a change in health behaviour amongst psychopathic individuals. This fear-based approach is supported by our findings on the mediating role of fear of COVID-19 on predicting adherence from psychopathic traits. Finally, as disinhibition was a significant predictor of lower adherence beyond fear of COVID-19, it would be advantageous to target these traits. For example, public health campaigns offering ways to alleviate boredom as well as interventions aimed at increasing self-control or self-regulatory strategies (e.g., structuring the day by making plans) might help these individuals adhere to containment measures (Martarelli & Wolff, 2020).

4.2. Limitations and future directions

The measure of lockdown adherence had good internal consistency and covered a range of behaviours, better capturing the extent of people's adherence than studies using a single item (e.g., Zajenkowski et al., 2020). However, summing the 18 items to produce an overall adherence score did not take into account differences in severity between items, with some implying more risky or harmful breaches of lockdown rules than others. Some previous studies distinguished between measures of adherence (e.g., "hygiene", "social distancing", "venturous behaviour" in Blagov, 2020), but the factor analysis performed here did not yield useful factors based on some latent construct such as severity or type of containment measure. Nevertheless, when the sample was divided into "high" and "low" TriPM scorers based on a median split, those with higher levels of psychopathic traits scored lower on every adherence item, with more marked differences for items referring to breaches of lockdown rules (e.g., avoid meeting people you do not live with), than those related to hygiene behaviours (e.g., wash hands regularly). It seems that people higher in psychopathic traits are more likely to ignore the more stringent restrictions compared to more general health guidelines.

The relatively small sample size and predominantly female sample are noted as limitations, particularly as it is well-established that psychopathic or Dark Triad Traits tend to be higher in males. However, mean TriPM scores in our sample are comparable to those reported in other general population samples (e.g., van Dongen et al., 2017). In addition, this study, along with similar studies published to date, is limited by its reliance on self-report measures. Despite the survey instructions assuring participants that their data will be anonymous so they can answer honestly, self-report measures can be biased, and people higher in psychopathic traits are prone to lying (Baughman et al., 2014). To address this limitation, it would be beneficial to use more objective measures of adherence, such as contact tracing using a mobile phone app (e.g., NHS Track and Trace System), which could detect prolonged close contacts with new people or not obeying lockdown orders. However, this would require informed consent for ethical reasons, and consequently cannot completely avoid bias, as individuals who adhere less to guidelines might also be less likely to agree to participate in such a study.

Incorporating a measure of psychopathic traits into ongoing large-scale longitudinal studies could confirm the current findings in a representative, population-based sample or reveal effects of psychopathic traits on the risk of COVID-19 infection which we were underpowered to detect. One example is the COVID-19 Social Study, which surveys people across the UK every week. The authors investigated other predictors of adherence, including Big Five personality traits, in over 20,000 UK adults during the first lockdown, and found that the effects of different personality traits changed over time as lockdown became less stringent (Wright & Fancourt, 2021).

Nevertheless, a more complete understanding of the predictors of adherence depends on incorporating the present findings within the growing evidence base for the impact of other factors. Examples include changes in risk perception of the consequences of non-adherence, and interpersonal trust (Chan et al., 2020; Petherick et al., 2021).

4.3. Conclusion

Psychopathic traits were found to predict adherence to COVID-19 containment measures among university students living in the UK during its second and third national lockdowns, even after controlling for sociodemographic variables such as age, sex and living situation. These findings suggest that individual differences in psychopathic traits should be considered when designing public health communications and implementing measures to reduce disease transmission during the COVID-19 pandemic, as well as potential future pandemics.

Data and code availability statement

Data are available via a request to the Authors, on the condition that a formal data sharing agreement is used.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.crbeha.2022.100082.

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