SHORT RESEARCH ARTICLE

Knowledge of social distancing measures and adherence to restrictions during the COVID-19 pandemic

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Abstract

Issue addressed: With no efficacious treatments or vaccines available, social distancing measures remain the most effective approach for reducing the transmission of the COVID-19 virus. However, adherence to social distance measures presumably requires knowledge and understanding of the current social distancing restrictions.

Methods: A modified version of the Theory of Planned Behaviour examined the role of knowledge and understanding of current social distancing measures in predicting intentions to adhere to social distancing restrictions. An online survey was administered to respondents (N = 374) in Melbourne, Australia during a period of heightened social distancing restrictions. In addition to measuring respondents' general intentions to adhere to restrictions, vignettes were used to assess intended behaviour in specific situations.

Results: Knowledge of social distancing restrictions predicted intentions to adhere in specific situations, but not general intentions to adhere. Knowledge of restrictions also predicted positive attitudes towards current restrictions and a greater perceived ability to adhere to the restrictions, while positive attitudes was a good predictor of both general and specific intentions to adhere.

Conclusions: The findings suggest that attitudes towards restrictions may influence whether individuals attempt to adhere to restrictions, but knowledge of the restrictions influences whether the intended behaviour actually adheres to current restrictions.

So what?: These outcomes indicate that members of the public should be educated regarding the negative consequences associated with the COVID-19 virus and the capacity of social distancing to reduce transmission of the virus, and a need for social distancing restrictions to be uncomplicated and clearly communicated.

KEYWORDS
behavioural theory, epidemiology, local government, quantitative methods, social determinants

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1 | INTRODUCTION

The COVID-19 pandemic is a devasting public health emergency, which poses a high risk to vulnerable groups, such as the elderly and those with chronic heart or lung disease, and has the potential to overburden many health care systems. As there are no efficacious treatments or vaccines currently available, social distancing measures remain the most effective approach for reducing the transmission of COVID-19. While authorities across the globe have implemented a variety of social distancing measures, the effectiveness of these measures relies on individuals' adherence to the restrictions.

The Theory of Planned Behaviour (TPB) posits that attitudes, perceived norms and behavioural control are the best predictors of intentions to perform a behaviour.[1] The TPB has proved to be a useful framework for predicting intentions to perform various health-related behaviours.[2,3] In the case of COVID-19 social distancing measures, it is anticipated that more positive attitudes towards the measures (attitudes), a perception that others are adhering to the measures (perceived norms) and a belief that one has the capacity to adhere (behavioural control), will predict greater intentions to adhere to the restrictions.

Favourable attitudes towards social distancing measures have been found to predict intentions to self-isolate during the COVID-19 pandemic.[4,5] Favourable attitudes include the belief that social distancing measures will be effective in reducing transmission of the COVID-19 virus, and the belief that reducing transmission of the virus is important. Researchers have demonstrated that individuals who believe social distancing measures are an effective method for reducing transmission of a virus are more likely to adhere to restrictions.[6,7] Furthermore, prior to the outbreak of the pandemic, individuals in China reported greater intentions to adhere to restrictions if they believed the social distancing measures were important.[4]

The TPB posits that social norms also exert pressure on individuals to perform particular health behaviours.[1,8] In the context of social distancing, social norms refer to the belief that referents, including family, friends and important members of the public, support and are adhering to the social distancing restrictions. During the COVID-19 pandemic there has been some evidence that individuals who believe that others are adhering to restrictions are more likely to adhere to restrictions themselves.[7–9]

In addition to being motivated to perform a behaviour, the TPB also proposes that perceived behavioural control is an important predictor of intentions.[1] In the context of social distancing, perceived behavioural control refers to the perceived difficulty or ease associated with adhering to social distancing measures.[1,4] Perceived barriers or obstacles to adherence may include financial pressures or the need to care for sick relatives. Evidence from the early stages of the pandemic support the proposition that greater perceived behavioural control is associated with greater intentions to adhere to social distancing measures.[4,7,8]

1.1 | Knowledge and understanding of social distancing measures

The TPB relies on the assumption that individuals are aware of the requirements of their intended actions. For instance, it is assumed that an individual who intends to exercise or cease smoking cigarettes understands what these behaviours involve.[10,11] However, as social distancing measures change frequently, many individuals may not have an accurate knowledge or understanding of current restrictions.

A limitation of research examining intentions to adhere to social distancing restrictions is that it does not capture whether respondents understand if their intended behaviours actually adhere to the current restrictions.[4,5,8,12] For instance, respondents are typically asked broad questions about their adherence to social distancing measures (eg, 'I keep a safe distance from people outside of my direct household'), without researchers assessing whether respondents' behaviour does adhere with specific social distancing restrictions.[13,14] Consequently, respondents may report intentions to adhere to social distancing measures, when in fact their intended behaviour would (unknowingly) violate current restrictions. To overcome this methodological issue, in addition to asking about general intentions to adhere to restrictions, research should evaluate how respondents report they would behave in specific situations.

Knowledge and understanding of current social distancing measures may also directly influence attitudes, social norms and perceived behavioural control. For instance, increased knowledge of health behaviours is typically associated with more positive attitudes towards the behaviours.[15,16] Furthermore, to accurately assess whether others are adhering to the current restrictions, and the perceived difficulties associated with adherence, an individual presumably requires an accurate understanding of the current restrictions. Consequently, there is a need for research examining the relationship between knowledge and understanding of social distancing restrictions and the main predictors in the TPB.

1.2 | Aims and hypotheses

The present study aimed to examine whether a modified TPB including knowledge of current social distancing measures could predict intentions to adhere to social distancing restrictions. To reduce the impact of both hindsight bias and lack of insight regarding reactions to social isolation, the survey was conducted in metropolitan Melbourne, Australia, during stage 4 restrictions (Australia's highest level of restrictions). Furthermore, in addition to a scale asking about general intentions to adhere to the restrictions, respondents were also asked how they would behave in a number of hypothetical scenarios (ie, specific situations). This approach was designed to provide a more accurate assessment of intentions, and to help control for knowledge and understanding of restrictions.

It was hypothesised that greater knowledge of the stage 4 restrictions would predict intentions to adhere to stage 4 restrictions, as well as more positive attitudes towards the restrictions, a greater perception of adherence to restrictions, and greater perceived behavioural control (see Figure 1). It was also hypothesised that more positive attitudes towards restrictions, a greater perception of others adhering to restrictions, and greater perceived behavioural control would predict intentions to adhere to stage 4 restrictions. However, as lower knowledge of the restrictions may lead to individuals mistakenly believing their intended behaviours will adhere to the restrictions, it was anticipated that knowledge would be a stronger predictor of intentions in specific situations, compared to general intentions to adhere.

2 | METHOD

2.1 | Participants

Respondents consisted of 374 adults who were living in metropolitan Melbourne, Australia between 1 August 2020 and 15 September 2020. During this period, metropolitan Melbourne was in stage 4 social distancing restrictions. During stage 4 restrictions a curfew was in place between the hours of 8 PM and 5 AM, during which residents could only leave their home for medical care and caregiving. During hours outside of the curfew, in addition to avoiding social gatherings and maintaining a distance of 1.5 m, residents were not permitted to travel more than 5 km from their place of residence and could only leave their homes for essential reasons including shopping for essential items, exercise and permitted work.

At the time of data collection respondents had been experiencing varying degrees of social distancing restrictions for approximately six months. On the 15 March 2020 a series of mandatory restrictions were implanted across Australia. In the period prior to the stage 4 restrictions residents of Melbourne were only allowed to leave their homes for travel to and from work or medical appointments, for exercise, and to pick up essential supplies. Information regarding changes to social distancing restrictions was typically communicated through television and radio news services, the Victorian government health and human services website (https://www.dhhs.vic.gov.au/coronavirus), and via social media.

Respondents were recruited through Qualtrics Market Research Panels. The respondents consisted of 209 females and 165 males ranging in age from 19 to 86 years (M = 44.0, SD = 15.6). The majority of respondents reported living with a spouse or family members (78.9%). The majority of respondents also reported working during stage 4 restrictions (77.0%), working an average of 33.8 hours per week (SD = 18.3). Of those working, 246 (85.4%) reported working from home during stage 4 restrictions.

2.2 | Materials

2.2.1 | Social distancing vignettes

The social distancing vignettes consisted of 15 short scenarios which aimed to assess respondents' knowledge and understanding of the stage 4 restrictions, as well as their intentions to adhere to restrictions in specific situations (situational intentions). Each vignette involved a short written scenario in which the protagonist may have been violating the stage 4 restrictions (eg, 'Sally's best friend Olivia recently lost a loved one. Sally is very concerned about Olivia, and as Olivia lives less than 5 km away, Sally decides to visit her to provide comfort in person.'). The protagonist was violating the stage 4 restrictions in 12 of the vignettes, and not violating the restrictions in the remaining three vignettes.

To assess knowledge and understanding of stage 4 restrictions, respondents were asked whether a statement that the protagonist violated stage 4 restrictions (eg, 'By visiting Olivia, Sally is violating stage 4 restrictions') was true or false. The number of correct responses was summed to create a total knowledge score. Respondents were then required to indicate whether they would perform the behaviour outlined in the vignette if they were the protagonist (eg, 'If I were in Sally's position, I would visit Olivia.') on a 6-point scale ranging from 1 (*Strongly Disagree*) to 6 (*Strongly Agree*). Scores from the 12 vignettes in which restrictions were violated
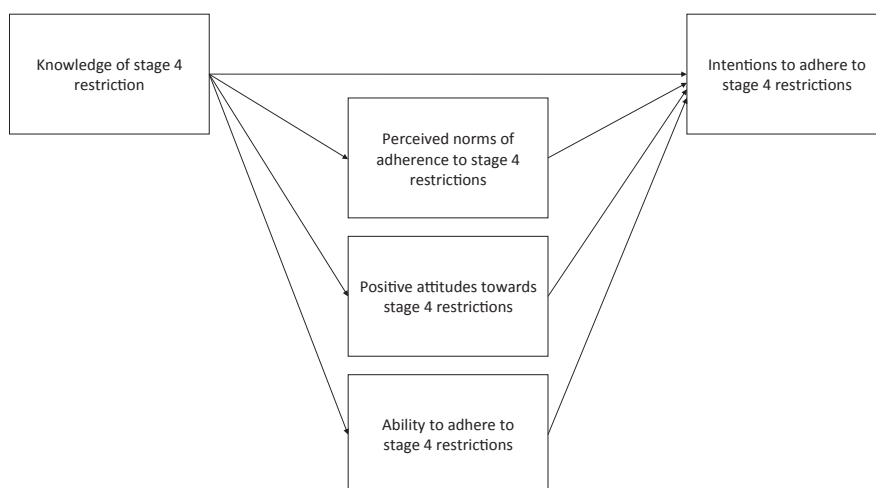

FIGURE 1 Conceptual path model

were reverse coded and summed to create a situational intentions score, with higher scores indicating greater intentions to adhere to restrictions in specific situations. As only vignettes in which restrictions were violated were used to calculate situational intentions, the majority of vignettes described scenarios in which the protagonist was violating stage 4 restrictions.

2.2.2 | General intentions scale

General intentions to adhere to the stage 4 restrictions was assessed using a 3-item scale. Respondents were asked to rate the extent to which they agreed with statements about their future intentions (eg, "While the stage 4 restrictions remain in place, I intend to follow the government guidelines concerning appropriate social distance") on a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Scores from the three items were summed to create a general intentions score, with higher scores indicating greater intentions to adhere to restrictions.

2.2.3 | Attitudes scale

A 3-item scale was used to measure attitudes towards the stage 4 restrictions. Respondents were asked to rate the extent to which they agreed with statements regarding the effectiveness or importance of the restrictions (eg, 'The current social distancing and gathering restrictions are necessary.') on a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Scores from the three items were summed to create an attitude score, with higher scores indicating more positive attitudes towards the stage 4 restrictions.

2.2.4 | Social norms scale

Social norms were assessed using a 3-item scale. Respondents were asked to rate the extent to which they believed family, friends, and members of the general public were adhering to the stage 4 restrictions (eg, 'My friends and family are following the social distancing rules') on a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Scores from the three items were summed to create a social norms score, with higher scores indicating a greater perception that people were adhering to the stage 4 restrictions.

2.2.5 | Perceived behavioural control scale

A 2-item scale was used to assess respondents' perceptions that they have the ability to adhere to the stage 4 restrictions. Respondents were asked to rate the extent to which they agreed with statements regarding their ability to adhere (eg, 'I feel that I have the ability to follow the current social distancing restrictions.') on a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Scores from

the two items were summed to create a behavioural control score, with higher scores indicating greater perceived ability to adhere to the stage 4 restrictions.

2.3 | Procedure

After receiving Human Research Ethics approval, the survey was administered via Qualtrics online survey platform over a 3-week period from 28 August 2020 to 15 September 2020. After providing informed consent, respondents were asked to provide demographic information including their age, gender, residential postcode, current living arrangements and current working conditions. Respondents were then asked to complete the social norms scale, the attitude scale and perceived behavioural control scale. Respondents then completed the social distancing vignettes, followed by the general intentions scale.

3 | RESULTS

Descriptive statistics are displayed in Table 1 and bivariate correlations are displayed in Table 2. Two path analyses were run to test the research hypotheses, one with situational intentions as the main outcome variable (see Figure 2), and the other with general intentions as the main outcome variable (see Figure 3). The analyses revealed that, as hypothesised, knowledge of restrictions was a statistically significant predictor of attitudes and perceived behavioural control. Greater knowledge of stage 4 restrictions predicted more positive attitudes towards the stage 4 restrictions and a greater perceived ability to adhere to the restrictions. However, knowledge was not a statistically significant predictor of social norms, consequently the hypothesis that knowledge of restrictions would predict social norms was not supported.

Knowledge was a statistically significant predictor of situational intentions. As hypothesised greater knowledge of the stage 4

TABLE 1 Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Situational intentions to adhere	43.60	10.10	12.00	61.00
General intentions to adhere	14.01	1.78	3.00	15.00
Social norms	12.90	1.68	6.00	15.00
Attitudes towards restrictions	13.65	1.86	6.00	15.00
Perceived behavioural control	9.24	1.29	4.00	10.00
Knowledge of restrictions	9.41	2.41	2.00	14.00

TABLE 2 Bivariate correlations

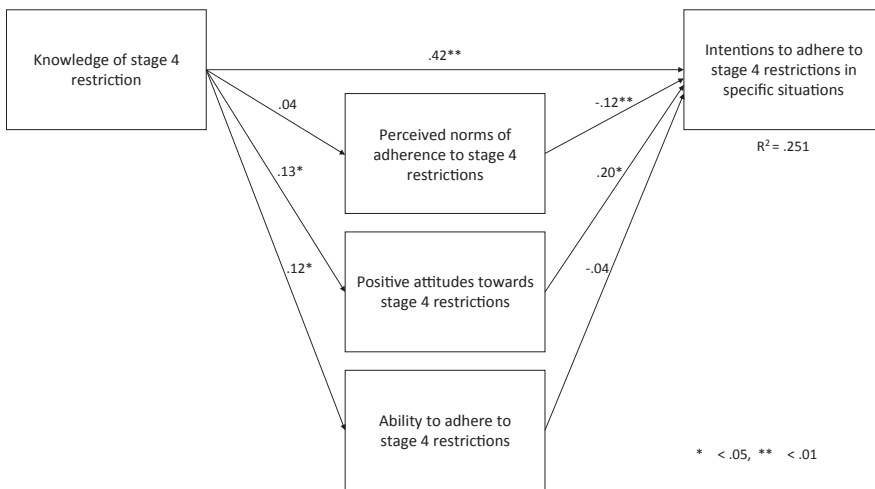|	1	2	3	4	5	6
1. Situational intentions to adhere						
2. General intentions to adhere	0.29**					
3. Social norms	0.02	0.17**				
4. Attitudes towards restrictions	0.24**	0.43**	0.36**			
5. Perceived behavioural control	0.17**	0.39**	0.43**	0.65**		
6. Knowledge of restrictions	0.45**	0.13**	0.04	0.13*	0.12*	

*$P < 0.05$.

**$P < 0.01$.

FIGURE 2 Path model with situational intentions to adhere as the main outcome variable. Paths represent standardised parameter estimates
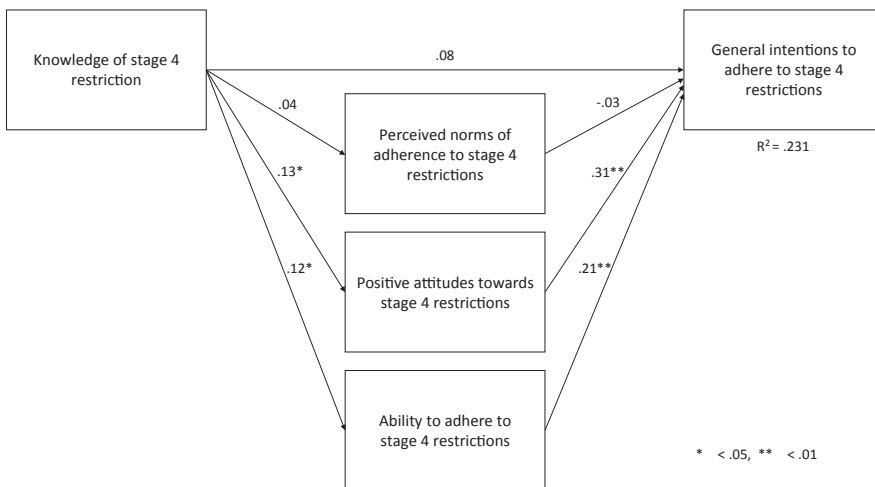

FIGURE 3 Path model with general intentions to adhere as the main outcome variable. Paths represent standardised parameter estimates

restrictions predicted greater intentions to adhere to stage 4 restrictions in specific situations. Also as hypothesised, attitudes were a statistically significant predictor of situational intentions, with more positive attitudes predicting greater intentions to adhere in specific situations. However, contrary to the hypothesis, while social norms was a statistically significant predictor of situational intentions, the negative parameter estimate indicates that greater perceptions of

others adhering to stage 4 restrictions were associated with lower intentions to adhere in specific situations. Furthermore, the hypothesis that perceived behavioural control would predict specific intentions was not supported, with no statistically significant relationship evident between these variables.

Knowledge was not a statistically significant predictor of general intentions. While this result does not support the hypothesis that

knowledge would be a significant predictor of general intentions, it does support the hypothesis that knowledge would be a stronger predictor of intentions in specific situations, compared to general intentions to adhere. As hypothesised, there was a statistically significant moderate positive relationship between attitudes and general intentions, indicating that more positive attitudes predicted greater general intentions to adhere. Furthermore, as hypothesised perceived behavioural control was also a statistically significant predictor of general intentions, with a greater perceived ability to adhere to restrictions predicting greater general intentions to adhere. Contrary to the hypothesis, social norms was not a statistically significant predictor of general intentions.

4 | DISCUSSION

The present study aimed to examine the role of knowledge and understanding of current social distancing measures in predicting intentions to adhere to social distancing restrictions during the current COVID-19 pandemic. A modified version of the TPB was used to assess the relationship between knowledge of restrictions, attitudes towards restrictions, social norms, perceived behavioural control, and intentions to adhere to restrictions during a period of heightened restrictions in Australia. To provide a more accurate assessment of intentions, and to help control for knowledge and understanding of restrictions, both general intentions to adhere and intentions to adhere in specific situations were assessed.

As hypothesised, knowledge was a statistically significant predictor of specific intentions to adhere, but not general intentions to adhere to restrictions. The finding that knowledge predicts specific but not general intentions indicates that despite good intentions, a lack of knowledge and understanding may result in unintended violations of restrictions. Respondents with lower knowledge of restrictions were no less likely to indicate general intentions to violate restrictions, but when asked about specific intentions these respondents indicated behaviours that would in fact violate the current restrictions. By assessing specific intentions, the present study has overcome a limitation of previous research which typically has only assessed general intentions.[13,14] This approach has provided greater insight into respondents' intended behaviour and captures the intentions of respondents who may be unknowingly violating restrictions. Consequently, the relationships observed in this study may be more meaningful than the outcomes observed in research examining only general intentions to adhere.

Knowledge was also a significant predictor of both attitudes and perceived behavioural control. These outcomes expand on previous research using the TPB to predict adhere to social distancing measures.[4,8] Unlike models examining adherence to other health related behaviours, understanding the role of knowledge in relation to social distancing is important as distancing measures are novel and change frequently. Consequently, the present study extends the TPB, indicating that in addition to directly influencing intentions to adhere, knowledge of social distancing measures may indirectly influence intentions via more positive attitudes and greater perceived behavioural control.

The results of the present study also indicate that attitudes towards the current restrictions was a statistically significant predictor of intentions to adhere. This finding supports previous research demonstrating that attitudes towards social distancing measures is an important predictor of adherence to the measures.[4,5,7,17] Compared to social norms and perceived behavioural control, attitudes was a stronger predictor of both general and specific intentions to adhere to the restrictions. This suggests that beliefs that social distancing restrictions are effective and necessary increases the likelihood that individuals will attempt to adhere to the restrictions and will know which behaviours are required for adherence.

Perceived ability to adhere to social distancing restrictions was a significant predictor of general intentions to adhere, but not intentions to adhere in specific situations. This finding supports the hypothesis that greater perceived behavioural control would be a stronger predictor of general intentions, compared to specific intentions. The use of vignettes in the present study controlled for respondents' knowledge and understanding of restrictions, and required respondents to consider the actual behaviours required for adherence with current restrictions. However, as the vignettes required respondents to imagine specific situations that may not occur in their own lives, barriers reducing their ability to adhere may not have been relevant in many of the scenarios. This outcome highlights the importance of measuring both general and specific intentions.

Contrary to hypotheses, social norms was not a significant predictor of intentions to adhere in specific situations, and was a negative predictor of general intentions to adhere. This finding indicates that individuals who perceive others are adhering to the restrictions are less likely to adhere to the restrictions themselves. This outcome contradicts previous research demonstrating that individuals who believe that others are adhering to restrictions are more likely to adhere to restrictions themselves.[7-9] A possible explanation is that a perception that the majority of individuals are adhering to restrictions may lead individuals to believe that the likelihood of transmission of the virus is low.[18] Consequently, individuals may perceive a reduced need to socially distance themselves if they believe others are adhering to the restrictions.

4.1 | Implications

The findings that attitudes towards restrictions predicts adherence in both general and specific situations, and knowledge of restrictions directly predicts intentions to adhere in specific situations, together suggest that attitudes will influence whether individuals attempt to adhere to restrictions, while knowledge determines whether they know how to adhere. This outcome has practical implications for the way social distancing measures are implemented and communicated to the public. First, the outcomes imply that members of the public need to understand the negative consequences associated with the COVID-19 virus, the capacity of social distancing to reduce

transmission of the virus, and the positive impacts associated with a reduction in transmission. Second, the outcomes of the present study also suggest that social distancing measures should be uncomplicated, easy to understand and easy to remember. In addition to improving the capacity of individuals to adhere with restrictions, simplifying or clearly explaining the restrictions may also improve positive attitudes towards the restrictions and reduce perceived barriers to adherence.

4.2 | Limitations and future research

The present study examined predictors of general and specific intentions to adhere with social distancing measures based on the proposition that intentions are the best predictor of future behaviour.[1] However, as the study was cross-sectional it remains unclear whether both general and specific intentions to adhere are good predictors of future social distancing behaviour. Additionally, while general and specific intentions to adhere were assessed to control for respondents' situational circumstances and lack of knowledge respectively it remains unclear which of these will better predict future adherence to restrictions. Future research employing a longitudinal design would enable an examination of the extent to which intentions to adhere predicts actual social distancing behaviour.

The generalisability of the present study's findings may also be limited as the data were collected during a period of heightened social distancing restrictions. Surveying respondents during stage 4 restrictions was a strength of the study as respondents were likely to have accurate insight into their behaviour during social isolation. However, stage 4 restrictions also coincided with the period of highest community transmission rates in Melbourne. Consequently, as the likelihood of transmission was high respondents may have been more motivated to adhere to the restrictions during this period. Future research should examine the relationship between knowledge, attitudes, social norms, perceived behavioural control and intentions to adhere to restrictions during varying periods of social distancing restrictions and community transmission rates.

A further limitation is that the present study examined respondents' knowledge of current social distancing restrictions but did not examine respondents' understanding of why adherence to restrictions is important. While knowledge of the restrictions is required to prevent unknown violations of restrictions, understanding the importance of restrictions may be more strongly associated with motivation to adhere. Future studies would benefit from the inclusion of measures examining respondents' understanding of the importance of social distancing restrictions, and how this relates to other factors in the TPB.

5 | CONCLUSION

Using a modified version of the TPB, the present study aimed to examine the role of knowledge of current social distancing measures in predicting intentions to adhere to social distancing restrictions. The findings indicate that knowledge predicts intentions to adhere in specific situations, but not general intentions to adhere. Knowledge of restrictions also predicted positive attitudes towards current restrictions and a greater perceived ability to adhere to the restrictions, and positive attitudes towards restrictions was a good predictor of both general and specific intentions to adhere. Together, these findings suggest that attitudes towards the restrictions will influence whether individuals attempt to adhere to restrictions, but knowledge of the restrictions will influence whether the intended behaviour actually adheres to current restrictions. These outcomes imply that social distancing restrictions need to be uncomplicated, easy to understand and remember, and that members of the public need to be educated regarding the negative consequences associated with the COVID-19 and the capacity of social distancing to reduce transmission of the virus.

CONFLICT OF INTEREST
The Authors declare that there is no conflict of interest.

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