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Theory of Planned Behavior Constructs as Mediators of Relations Between Personality Traits, Trust, and COVID-19 Preventive Behavior Adherence

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Abstract

Objective: Dispositional constructs (personality traits, generalized beliefs) are associated with health behaviors, but few studies test potential mechanisms. The current study tested an integrated theoretical model specifying indirect effects of personality traits (conscientiousness, extraversion) and socio-political beliefs (trust in political leaders and health authorities) on initial participation, and subsequent trajectories, in COVID-19 preventive behaviors (handwashing, physical and social distancing, mask wearing) mediated by social cognition constructs (attitudes, subjective norms, perceived behavioral control) and intentions.

Methods: Belgian residents (*N*=1762) completed measures of dispositional and social cognition constructs and intentions for COVID-19 preventive behaviors on an initial occasion and self-reported their engagement in the behaviors on four follow-up occasions from April to July 2021. Model predictions were tested using latent growth curve modeling.

Results: Indirect positive effects of conscientiousness and trust in politicians and health authorities, and indirect negative effects of extraversion, on health behavior intentions and initial behavior participation as mediated through social cognition (with minor exceptions). These accounted for non-trivial variance in each outcome. Contrary to predictions, model constructs did not account for variance in behavioral trajectories.

Conclusion: The current analysis lends support for the model across behaviors, adding to an evidence base of potentially malleable determinants of COVID-19 preventive actions and a candidate mechanism. How to sustain adherence to COVID-19 preventive actions remains an open question in need of further research. Replication studies in other national contexts and other public health crises are warranted.

Key words: Health behavior determinants; Social cognition theory; Trust; Personality and individual differences; COVID-19 prevention.

Adherence to COVID-19 preventive behaviors, such as mask wearing, physical distancing, and handwashing, is vital for limiting the spread of infection and reducing the severity of cases (Talic et al., 2021). As societies transition toward recovery from the COVID-19 pandemic and to ongoing management of COVID-19 infection rates as an endemic public health issue, promoting sustained adherence to these behaviors remains a key priority for health authorities. Developing effective interventions requires understanding and targeting the modifiable psychological determinants that drive these behaviors (McEwan et al., 2019). Such interventions are most sustainable when grounded in robust theoretical frameworks purposed to identify potentially modifiable determinants reliably associated with engagement in preventive health behaviors and the processes involved (Wollast et al., 2021). Theories from the behavioral sciences, particularly social psychology, feature prominently among frameworks typically adopted to identify determinants and, in so doing, assist in informing development of these interventions (Conner & Norman, 2015; Hagger, 2025; Hagger & Hamilton, 2022). In sum, while sustained adherence to COVID-19 preventive measures is a pressing public health challenge, progress requires a clearer understanding of the psychological mechanisms that translate stable dispositions and socio-political beliefs into concrete health behaviors, a gap the present study aims to address.

Literature Review

Theories from the social cognition tradition that adopt cognitive, information processing metaphors for human decision making, have demonstrable utility as means to identify health behavior determinants, particularly in the health domain (Conner & Norman, 2015; Fishbein et al., 2001; Hagger, 2025). Prototypical of these approaches is the Theory of Planned Behavior (TPB; Ajzen, 1991), which theory posits that intention, representing an individual's motivational

commitment to perform a given target behavior serves as the most proximal determinant of subsequent performance of that behavior. Intention is a function of three belief-based constructs: attitudes (evaluation of the utility of the target behavior), subjective norms (perceived pressure from significant social agents to engage in the behavior), and perceived behavioral control (beliefs in personal capacity to perform the behavior). Intention is proposed to mediate relations between the belief-based theory constructs and target behavior performance. Multiple primary studies testing theory predictions and meta-analyses of theory applications across a variety of health behaviors and national groups have yielded support for its basic predictions (e.g., McEachan et al., 2011; Hagger et al., 2024), including in the context of COVID-19 prevention (e.g., Wollast et al., 2021).

In the original conceptualization of the TPB, Ajzen (1991) posited that effects of dispositional variables (e.g., personality factors, trait-like constructs such as socio-political beliefs) and extraneous environmental and contextual factors (e.g., social environment, socioeconomic status) on behavior would be subsumed by the set of belief-based constructs proposed in the theory. That is, the beliefs were expected to be by-products of the intra-individual and socio-environmental conditions in which individuals make decisions and, as such, they would mediate the effect of variables representing such conditions on behavioral performance. However, beyond some initial hypothetical examples, no specific predictions or hypotheses were proposed or tested. Subsequently, researchers have proposed and tested models in which relations between intra-individual and socio-environmental variables and behavioral performance are mediated by attitudes, norms, and perceived behavioral control from the TPB (e.g., Bogg & Roberts, 2004; Hagger & Hamilton, 2021; Conner & Abraham, 2001; Godin et al., 2010; Rhodes & Courneya, 2003). The non-zero indirect effects of the dispositional and socio-

environmental constructs mediated by the theory-based social cognition constructs identified in these tests highlighted the informational function these factors serve in informing individuals' beliefs and subsequent decision making, as reflected in their intentions and subsequent behavior. Although this approach has been adopted and tested on multiple occasions over the years and in a number of behavioral contexts, Bogg and colleagues (2020, 2023) recently assigned it a label: the disposition-belief-motivation framework. These effects corroborate Ajzen's theorizing and offer a proposed mechanism by which dispositions and environment related to action (for a more detailed discussion see Hagger & Hamilton, 2024; Hagger, 2025).

Most presciently, there have been numerous studies testing this framework in the context of COVID-19 preventive behaviors (Bogg et al., 2023). In a recent application, Griffith et al. (2024) found an integrated social cognition model based on the TPB fit well. In this model, the effects of conscientiousness and extraversion, as well as socio-political beliefs (e.g. political orientation, trust in government, and populist beliefs) influenced COVID-19 vaccination uptake indirectly through attitudes, subjective norms, and perceived behavioral control. They also made comparisons with two other behaviors outside the COVID-19 context, that varied in the extent to which they were expected to have political relevance: physical activity (low relevance) and sugar-sweetened beverage consumption (high relevance). Results indicated indirect effects of the dispositional and socio-political factors on behavior in each case mediated by the social cognition constructs supporting the general premise of the model. The core assumption of the disposition–belief–motivation framework is that dispositions and contextual factors serve as distal determinants of behavior, exerting their influence primarily through belief-based processes (attitudes, subjective norms, and perceived behavioral control). In other words, individual differences in personality and socio-political orientation are assumed to inform how people

evaluate preventive behaviors, perceive social expectations, and judge their own capacity to act, which then shape their intentions and eventual behavior. This framework therefore conceptualizes dispositions not as direct predictors of action but as antecedent factors whose effects are transmitted through motivational and cognitive mechanisms. However, Griffith et al. (2024) also observed some notable variations in the patterns and specific mediators across behaviors. Subjective norm was the most pervasive mediator of effects of trust in government on health behavior. Conscientiousness also featured prominently as an indirect predictor of physical activity and sugar-sweetened beverage restriction behaviors mediated by attitudes and perceived behavioral control. In addition to providing further corroboration of the generalized framework, findings also demonstrated the importance of identifying the specific mediators of dispositions across behaviors. In a COVID-19 prevention context, findings indicated, unsurprisingly, the high salience of generalized trust in government in informing individuals' beliefs and decisions to get vaccinated.

Importantly, Griffith et al. (2024) demonstrated that trust and personality traits are implicated in individuals' beliefs and decisions regarding future health behavior participation. Trust in government was reliably associated with health-related intentions, particularly for behaviors that have high socio-political relevance like COVID-19 vaccination and sugar-sweetened beverage (SSB) restriction. In these cases, subjective norms mediate the relationship between trust and behavior, highlighting the importance of institutional confidence during public health crises. These findings align with previous research suggesting that trust in government increases compliance with public health recommendations (Van Oost et al., 2022) and that socio-political beliefs are predicting health-related decisions (Stecula & Pickup, 2021).

Personality traits from the Five-Factor Model (Costa & McCrae, 1992) have also emerged as consistent dispositional predictors of health behaviors in prior research adopting this framework, with the conscientiousness and extraversion traits featuring prominently (e.g., Conner & Abraham, 2001; Phillips et al., 2003; Rhodes et al., 2003). For example, Griffith et al. (2024) found indirect effects of conscientiousness on health behavior intentions for physical activity and SSB restriction, with effects was mediated by perceived behavioral control and attitudes, suggesting that individuals' with tendencies toward behavioral regulation and consistent application of effort afforded by the conscientious trait are more likely to form adaptive beliefs about their capacity to perform these behaviors and are likely to intend to do so in future. In addition, the extraversion trait has also demonstrated efficacy in intention and behavioral prediction in research on integrated models. For example, prior research has indicated direct and indirect effects of extraversion on health behaviors such as physical activity (Rhodes & Courneya, 2003; Rhodes et al., 2002) indicating that individuals with tendencies to seek out social engagement and external stimulation are more likely to be motivated to adopt or maintain health behaviors, particularly those that take place in social contexts. However, it is important to note that the majority of evidence linking extraversion to positive health behaviors comes from contexts in which behaviors are socially engaging or rewarding (e.g., physical activity, see Rhodes & Courneya, 2003; Rhodes et al., 2002). By contrast, many COVID-19 preventive behaviors (e.g., mask wearing, limiting social contacts, physical distancing) may directly restrict opportunities for social interaction. Therefore, although extraversion has been positively associated with health behaviors in some domains, it may negatively predict intentions and adherence to COVID-19 preventive measures that reduce social engagement. Taken together, these findings further align with the disposition-belief-motivation framework (e.g., Bogg et al.,

2023) and with the original specification of social cognition theories (Ajzen, 1991; Hagger et al., 2019).

More recently, Bogg and colleagues (2025) extended this line of research by testing an integrative psychosocial model of COVID-19 booster vaccination uptake in a large U.S. longitudinal sample. Their results showed that dispositional traits (e.g., openness), socio-political beliefs, and contextual factors predicted booster vaccination indirectly through belief-based and motivational pathways, including vaccination intentions and prior vaccination behavior. This work provides further support for the disposition–belief–motivation framework and illustrates its value in explaining how distal individual differences shape preventive health behaviors through social-cognitive processes.

The Present Study

In the present study we adopted a disposition-belief-motivation framework aimed to test the predictions of an integrated model in which belief-based social cognition constructs, represented by core constructs from the TPB, namely, attitudes, subjective norms, and perceived behavioral control, served to mediate relations between two key personality traits (conscientiousness, extraversion), institutional trust (trust in political leaders, health authorities), and intentions and behavior with respect to adherence to COVID-19 preventive behaviors over time. The novel contribution of our study lies in the advance it offers over prior research adopting this approach (e.g., Griffith et al., 2024), specifically through its application to a broader range of target COVID-19 preventive behaviors, namely, mask wearing, social contact limitations, physical distancing, and handwashing (for a discussion regarding the distinction between social contact limitations and physical distancing, see Wollast et al., 2025). Furthermore, we leverage longitudinal data across several months with multiple behavior follow-

up occasions in a large, nationally rich and diverse sample. This longitudinal design allows us to examine the model's applicability to sustaining health behaviors as well as explaining individual differences in health behavior in a single time period. This addresses key, often-cited limitation of a large proportion of prior applications of social cognition theories in health behaviors that adopt cross-sectional designs and, as a consequence, do not enable tests of the efficacy of the model in accounting for construct change or the trajectories in behavior over time (for a discussion see Hagger & Hamilton, 2024; Hagger, 2025). In addition, prior research has tended to focus on relatively small samples that are selective and do not reflect the characteristics of the broader population stymying? the extent to which findings can be broadly generalized to the population. For example, Griffith et al.'s application of a similar model based on the same framework was tested in a relatively small, homogenous sample in Finland residents. By contrast, the current study adopted a large sample of Belgian residents that closely matched the profile of the general population on key demographic characteristics.

The target behaviors were selected based on their wide recommendation by public health authorities during the COVID-19 pandemic as effective strategies for preventing transmission of the virus with a good evidence base of efficacy in reducing infection rates and serious cases when applied consistently (Talic et al., 2021). The specific dispositional traits were selected because of the high politicization of COVID-19 restrictions and mitigation measures and general lack of trust in government-sanctioned health advice. Conscientiousness and extraversion were selected given their prominence as correlates of health behaviors (e.g., Bogg & Roberts, 2003), broadly speaking, and specifically because they have demonstrated indirect effects on health behaviors through behavior-related beliefs and intentions in previous tests of models adopting a dispositional-belief-motivation framework (e.g., Conner & Abraham, 2001; Rhodes et al., 2002).

We aimed to test a series of hypotheses based on the integrated model, each focused on the effects of change in model predictors on trajectories of key outcomes as specified in the model. Model hypotheses are summarized in the diagram presented in Figure 1. Specifically, we predicted non-zero indirect positive effects of conscientiousness on behavioral intentions mediated by each social cognition construct, namely attitudes, subjective norms, and perceived behavioral control (hypotheses 1a-c) for each behavior (mask wearing, social contact limitations, physical distancing, handwashing). We also predicted non-zero indirect positive effects of conscientiousness on baseline levels of behavior through serial mediation of each social cognition construct and intention (hypotheses 2a-c) for each behavior. Similarly, we predicted non-zero indirect negative effects of extraversion on behavioral intentions mediated by attitudes, subjective norm, and perceived behavioral control (hypotheses 3a-c) for each behavior, and non-zero indirect negative effects of extraversion on behavior serially mediated by each social cognition construct and intention (hypotheses 4a-c) again for each behavior.

Similarly, we predicted non-zero indirect positive effects of trust in political leaders and health authorities on behavioral intentions mediated by each social cognition construct (hypotheses 5a-c) for each behavior (mask wearing, social contact limitations, physical distancing, handwashing). In addition, we expected non-zero indirect positive effects of trust in politicians and health authorities on baseline levels of behavior mediated by each social cognition construct and intention (hypotheses 6a-c) for each behavior.

Method

This study complies with the APA ethical regulations for research on human participants and all participants gave informed consent, as approved by the institutional review boards of

[INSTITUTION MASKED FOR PEER REVIEW][1]. Raw data, syntax, study measures, and additional materials can be found online (https://osf.io/mde7u/?view_only=740d645226bd4186b2816bbf36cee456).

Participants and Procedure

The initial sample comprised French-speaking Belgian residents (N = 1762; men n = 622, women n = 1100; M age = 52.65; SD = 15.29; range = 18 to 91) recruited via Belgian online newspapers, mailing lists from universities, and social media platforms. Of those who reported their education level (77%, 23% unavailable), 9 (0.6%) participants reported having solely primary education or no schooling, 251 (15.4%) reported secondary education, 487 (29.8%) a bachelor's degree, and 887 (54.3%) a master's degree or a higher degree. Data were collected via a 6-wave online survey delivered to participants via email longitudinally. Our measures are found in four separate waves three weeks apart (T2 to T5) over three months between April 22 and July 2, 2021. Participants were provided eight days to respond to each survey prompt. Measures of all dispositional and social cognition constructs from the proposed model, behavioral intentions and baseline behavior were taken at T2, with subsequent behavioral follow-up at T3, T4, and T5. Of those initially recruited, 1,156 (34.39% attrition) were retained at T2. 1,053 (8.83% attrition) were retained at T3, 970 were retained (7.88% attrition) at T4, and 890 (8.25% attrition) were retained at T5.

Measures

Personality traits. Conscientiousness (e.g., "I complete household chores without delay") and extraversion (e.g., "I'm the star at parties") were measured using standardized items

[1]The current study is a novel analysis using a dataset of a larger project and tests hypotheses distinct from, and independent of, those published in prior outputs using data from this project (for details see Schmitz et al., 2022a,b; Wollast et al., 2024a,b).

and accompanying response scales from the French validation of the Mini International Personality Item Pool (Laverdière et al., 2020) derived from the Five Factor Model (Costa and McCrae) with responses provided on five-point scales (1 = *strongly disagree* to 5 = *strongly agree*). The conscientiousness (ω = .82) and extraversion (ω = .80) scales demonstrated acceptable composite reliability.

Institutional Trust. Trust in institutions was measured using two items in response to a common stem ("To what extent do you trust the following groups to guide you in adopting various health behaviors including frequent handwashing, mask wearing, physical distancing and limiting social contacts, and ventilating rooms.") with "political leaders" and "health experts" as the target groups. Responses were provided on five-point scales (1 = *not at all* to 5 = *absolutely*).

Health Behavior Intentions. Intentions were measured using a single item for each health behavior including handwashing ("I am ready to wash my hands as often as possible"), physical distancing ("I am ready to maintain a physical distance [1.50m] from people outside my bubble"), limiting social contact ("I am ready to limit my social contacts"), and mask wearing ("I am ready to wear a mask"). Responses were provided on five-point scales (1 = *strongly disagree* to 5 = *strongly agree*).

Health Behavior Attitudes. Attitudes were measured using a single item for each health behavior ("I am confident that [washing my hands as much as possible/maintaining a physical distance (1.50m) from people outside my bubble/limiting my social contacts/wearing a mask will slow the spread of COVID-19"). Responses were provided on five-point scales (1 = *strongly disagree* to 5 = *strongly agree*).

Perceived Health Behavior Norms. All participants answered three items for each health behavior. Norms were assessed with descriptive norms ("People who are important to me

follow [physical distancing/handwashing/limiting social contact/wearing a mask]"), moral norms ("Most people who are important to me think I should follow [physical distancing/handwashing/limiting social contact/wearing a mask]"), and prescriptive norms ("It is the right thing to do to follow [physical distancing/handwashing/limiting social contact/wearing a mask]"). Responses were recorded on five-point scales (1 = strongly disagree to 5 = strongly agree). The three items demonstrated good composite reliability for each health behavior (physical distancing: $\omega = .80$; handwashing: $\omega = .78$; limiting social contact: $\omega = .82$; mask wearing: $\omega = .80$).

Perceived Behavioral Control. Perceived behavioral control was measured using a single item for each health behavior ("For me, [washing my hands as much as possible/maintaining a physical distance (1.50m) from people outside my bubble/limiting my social contacts/wearing a mask] is easy"). Responses were provided on five-point scales (1 = *strongly disagree* to 5 = *strongly agree*).

Handwashing. The survey contained several items for each health behavior to assess their frequency in a variety of contexts (Wollast et al., 2023). Participants indicated how often they wash their hands in the following seven situations: "Before and after touching my eyes, nose or mouth," "after blowing my nose, coughing or sneezing," "Before and after putting on/removing my mask," "Before and after entering and leaving a public place," "Before and after entering and leaving a private area," "Before and after touching an object or surface that may be frequently touched by others," and "Before and after meeting people who do not share my home" on five-point scales (1 = *almost never* to 5 = *very often*). These items formed a highly reliable behavior index in each wave (ω range = .91 to .92).

Physical Distancing. Participants indicated how often they engage in the following seven behaviors: "I am careful to keep my physical distance from others, even friends and family," "If I have to leave the house, I make sure to maintain a minimum physical distance (1.50m) from other people," "I stay at home as much as possible," "I avoid non-essential travel," "I favor activities that I do alone rather than in groups," "I limit the amount of time I spend outdoors," and "I keep physical distance with people that are not part of my household" on five-point scales (1 = *almost never* to 5 = *very often*). These items formed a highly reliable index in each wave (ω range = .92 to .94).

Limiting Social Contact. Participants indicated how often they engaged in the following seven behaviors: "I have social interactions outside of the people I live with" (reversed), "I socialize with people outside of my bubble" (reversed), "I avoid small gathering in public places, such as parks or sporting events," "I avoid small gatherings in private places such as a friend's house," "I avoid crowded places like stores or public transportation," "I meet friends and family on social media or by phone rather than in person," and "I avoid face-to-face social interactions with others" on five-point scales (1 = *almost never* to 5 = *very often*). These items formed a highly reliable index in each wave (ω range = .89 to .91)[2].

Mask Wearing. Participants indicated how often they wore a mask in the following seven situations: "With visitors who come to my home and are not part of my close contacts," "With friends who are not my close contacts," "When I am walking outside with a friend," "When I am with people I know," "When I can't maintain a sufficient physical distance from others," "When I am with people who are not my close contacts in a room with poor or unknown

[2] When we omit the two reverse-scored items, reliabilities are slightly lower, but substantively similar (ω range = .88 to .90). To assess how robust our analyses are to the use or omission of these reverse-coded items, we conducted analyses using all seven items, as well as only the five non-reverse coded ones.

ventilation," and "When I am outdoors in places where masks are not required and where sufficient physical distance cannot be maintained" on five-point scales (1 = *almost never* to 5 = *very often*). These items formed a highly reliable index in each wave (ω range = .91 to .92).

Analytic Strategy

Data were analyzed using a series of four latent growth curve models to test study hypotheses for each behavior. Latent growth curve models estimate effects of predictor variables on both the intercept (baseline level) and slope (individual-level deviation from the sample-level trajectory) of the dependent or outcome variable. In the first instance, we fit an initial model to the data to describe overall baseline levels of the behaviors and their average trajectories in each sample. To do so, we estimate latent growth curve models without predictors. In these models, the mean of the intercept represents the average level of behavior in the baseline wave. All measures were rescaled to span from 0 (minimum) to 1 (maximum) such that parameter estimates greater than 0.5 imply greater self-reported engagement in the behavior than the scale midpoint. The average over-time slope of the model represents the average trajectory of a behavior in the sample over time. Negative slopes imply an average decrease in the behavior over time, with the inverse for positive slopes. The variance in the slope describes whether variability in individual-level trajectories can be distinguished from zero.

We then estimated structural equation models that predicted both the intercept (baseline level) and slope (individual deviation from the average trajectory) for each health behavior. The model treats each behavior as predicted by behavioral intentions. Attitudes, subjective norms, and perceived behavioral control regarding the behavior were entered as predictors of behavioral intentions. Personality (extraversion, conscientiousness) and institutional trust (in political leaders and health authorities) were entered as predictors of attitudes, subjective norms, and

perceived behavioral control. As before, for ease of interpretation, all variables were rescaled to range between 0 and 1. We included age, gender, and education as covariates in each analysis. All models reported bootstrapped standard errors with 5000 draws. Overall fit of each model with the data was evaluated using multiple criteria for goodness-of-fit including the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean square of residuals (SRMR), and the root mean square error of approximation (RMSEA). Values approaching or exceeding .950 for the TLI and CFI, and approaching or below .080 and .050 for the SRMR and RMSEA, respectively, were considered indicative of good model fit (Hu & Bentler, 1999). Models were implemented using the *lavaan* package in R (Rosseel, 2012). Full information maximum likelihood imputation was used for missing cases.

With respect to interpretation, estimates of the effects of each predictor on the intercept of a behavior can be interpreted in similar way to those reported in a typical linear multiple regression analysis: a one-unit change in a predictor is associated with a β-unit change in the outcome. Effects on the slope of a health behavior, however, should be interpreted relative to the average individual-level trajectory. In this case, therefore, a one-unit change in a predictor is associated with a β-unit deviation from the average trajectory. Negative coefficients indicate that an increase in a predictor is associated with a less positive trajectory in the outcome and vice-versa for a positive coefficient. In addition, the models test all possible direct and indirect effects on both the intercept and slope of each behavior. Estimates of these effects can be interpreted in a similar manner to the direct and indirect effects reported in conventional path analyses or structural equation models.

Results

Descriptive Statistics

Results of our latent growth curve models are presented in Table 1. Based on our no-predictor initial models, our analyses indicated that baseline self-reported adherence to the COVID-19 prevention behaviors were higher than the scale midpoint. The slopes for each behavior were negative, which should be interpreted as a slight decrease in behavioral adherence for the 'average' participant over time. The variance in slopes for each behavior indicated that the variability in individual-level trajectories was small, but different from zero (all behaviors: $\beta = .001$, $SE = .000$, $ps < .001$). The intercept and slope did not correlate for physical distancing or handwashing but displayed a weak and negative correlation for social distancing (though only the measure using the full index) and wearing masks, indicating that for these behaviors, those who initially engaged in them the most had slightly steeper declines.

Hypothesis Tests

Latent growth curve models demonstrated good fit with the data according to our multiple criteria adopted (CFI*s* >.998; TLI*s* > .994; RMSEA*s* < .023; SRMR*s* < .009). Full fit indices are presented in Table SI1 (supplemental materials). Direct effects of the predictor variables on outcomes for each model can be found in Tables SI2 to SI5 (supplemental materials). A comparison between models using the full limiting social contact index and the 5-item index omitting reverse-score items can be found in Table SI6. Findings are substantively identical. We focused first on the hypothesized indirect effects of personality traits, conscientiousness and extraversion on COVID-19 preventive behaviors mediated. In line with our hypotheses, we observed indirect, non-zero, positive effects of conscientiousness on behavioral intentions mediated by attitudes for physical distancing, and mediated by attitudes, subjective norms, and perceived behavioral control for handwashing (H1a-c). We did not observe any indirect effects for limiting social contact or mask wearing. We also observed indirect, non-

zero, positive effects of conscientiousness on initial levels of handwashing serially mediated by attitudes, subjective norms, and perceived behavioral control. However, this pattern did not extend to other health behaviors, leaving us with partial support for our hypotheses (H2a-c). In addition, we observed indirect, non-zero, negative effects of extraversion on behavioral intentions mediated by attitudes, subjective norms, and perceived behavioral control for physical distancing, limiting social contact, and mask wearing, but not handwashing, leaving us with partial corroboration of our hypotheses (H3a-c). An identical pattern was observed for the effect of extraversion on baseline levels of behavior mediated by the social cognition constructs and behavioral intentions (H4a-c).

Turning to hypotheses relating to the effects of political and health authorities trust dispositions on intentions (H5a-c) and behavior (H6a-c), we observed indirect, non-zero, positive effects of political trust on behavioral intentions mediated by attitudes, norms, and perceived behavioral control for physical distancing, limiting social contact, and mask wearing behaviors. For handwashing, the effect of political trust was only mediated by attitudes and norms. We also found that for all health behaviors, trust in health authorities had indirect, non-zero, positive effects on behavioral intentions mediated by attitudes, norms, and perceived behavioral control. In addition, we observed indirect, non-zero, positive effects of political trust on baseline levels of behavior serially mediated by attitudes, norms, and perceived behavioral control, and intentions, for physical distancing, limiting contact, and mask wearing. For handwashing, political trust's effects were mediated by attitudes and norms, and intentions. Further, we noted non-zero, positive indirect effects of trust in health authorities on behavior serially mediated by attitudes, norms, and perceived behavioral control, and intentions for all behaviors. Finally, we did not find

any evidence of direct or indirect effects of conscientiousness, extraversion, political trust, or trust in health experts on individual-level slopes for any behavior.

Discussion

In the present study, we applied an integrated social cognition model to predict a series of COVID-19 preventive behaviors in which key dispositional constructs, namely, conscientiousness and extraversion personality traits, and socio-political beliefs (trust in political leaders and health authorities) were conceptualized as distal correlates of key COVID-19 preventive behaviors (handwashing, physical distancing, limiting social contact, and mask wearing), mediated by the belief-based social cognition constructs and intentions from the theory of planned behavior. Key innovations of our analysis include the adoption of a relative new integrated approach based on a dispositional-belief-motivation framework steeped in extant theory; extension of prior tests to multiple preventive behaviors relevant to ongoing COVID-19 prevention; adoption of a longitudinal multi-wave design that permitted examination of change in the trajectories of the behaviors over time; and recruitment of a large sample of Belgian residents with demographic characteristics similar to that of the broader population. Overall, findings of our model test demonstrated hypothesis-consistent effects of the personality and socio-political dispositional beliefs on baseline adherence to multiple COVID-19 preventive behaviors, mediated by the belief-based social cognition constructs and intentions, apart from some idiosyncratic exceptions for indirect effects. Our findings contribute to the expanding evidence base of potentially modifiable determinants that are reliably related to behavior and, importantly, the mechanisms involved. Furthermore, they may not only signal which determinants should be favored in future preventive interventions, but also which groups might benefit more from them.

Personality Effects on Intentions

A notable finding of the current analysis was the consistent positive indirect effect of conscientiousness on intentions, mediated by belief-based constructs for the handwashing and physical distancing behaviors. This pattern corroborates prior findings indicating bivariate associations between conscientiousness and intentions to perform health behaviors (e.g., Bogg & Roberts, 2004), including multiple COVID-19 behaviors (e.g., Otterbring & Festila, 2022). Our analysis also aligns well with the findings of prior research examining conscientiousness and other conceptually related constructs such as trait self-control, as correlates of health behavior intentions and associated outcomes (e.g., Conner et al., 2023; Hagger et al., 2019). Taken together, our findings led support to the notion that the trait-consistent advantages that individuals higher in conscientiousness are afforded, such as better capacity to strategize, plan, and engage in effortful proactive actions in service of goals and greater endorsement of adaptive beliefs toward and tendencies to act, intentions, health-related behaviors. Another way to consider this pattern of effects is that they indicate individuals' likely strategic alignment of their belief systems to advantage their future performance of the behavior consistent with their traits – in this case, their generalized tendencies to proactively seek out behavioral opportunities to fulfil health goals. It is also unsurprising that these effects were observed across behaviors – conscientiousness and associated sub-facets such as self-control represent generalized tendencies that are likely to translate to goal-directed actions across multiple behavioral contexts (see Bogg & Roberts, 2004; Hagger & Hamilton, 2024). This is consistent with the notion that personality traits, as dispositions, present as a density of trait-consistent states, hence their small but consistent effects across the behaviors observed in the current study.

We also note a similar pattern for the indirect effects of extraversion on intentions for multiple behaviors mediated by the social cognition constructs. Specifically, we found negative indirect effects of extraversion on intentions to engage in physical distancing, limiting social contact, and mask wearing, mediated by the belief-based social cognition constructs. These patterns corroborate those observed in prior research adopting this framework in other behavioral contexts (e.g., Rhodes et al., 2002) including COVID-19 preventive behaviors (Griffith et al., 2024). In the case of the current behaviors, extroverts tend to exhibit generalized heightened motives for social connectivity and external stimulation (Rigotti et al., 2020). Such tendencies may be linked to an increased likelihood to align their beliefs, and subsequent behavioral orientation, toward actions likely to promote social contact with others with whom they have social relations or with whom they may have opportunities to form relations in future. This may be prescient in the case of COVID-19 preventive behavior insofar as many behaviors involve deliberate isolation from others to prevent infection rates and are, therefore, antithetical to these generalized motives to seek-out social contact, such as social or physical distancing, or, potentially limiting emotion expression and harmonious communication and interaction in social contact, such as mask wearing (Carbon, 2020; Marler & Ditton, 2021). Consistent with this notion, it is also noteworthy that this pattern of effect was not observed for handwashing behaviors, a behavior that is neither directly associated with limiting social interaction nor presents as a barrier to effective social interaction.

Socio-Political Dispositional Belief Effects on Intentions

A further headline finding of the current analysis was the positive indirect effects of the socio-political dispositional beliefs, namely, trust in political leaders and health authorities, on all COVID-19 preventive behaviors mediated by the belief based social cognition constructs. As

with the personality trait effects, our findings are consistent with those from prior research adopting integrated theoretical perspectives similar to the current model based on the disposition-belief-motivation framework in health behavior contexts, including COVID-19 preventive behaviors (e.g., Bogg et al., 2023; Griffith et al., 2024). In these cases, individuals citing high generalized trust in authorities to provide advice on, and manage strategies aimed at prevention of, COVID-19 infections will tend to align their beliefs and intentions with respect to their future performance of multiple COVID-19 preventive actions that dovetail with the recommendations of political leaders and experts (see Stecula & Pickup, 2021; Van Oost et al., 2022). For example, individuals with greater trust are more likely to view these behaviors as useful in achieving desired outcomes, such as protection from illness and prevention of transmission to vulnerable others, and will feel more capable of performing these behaviors due to a perceived lack of barriers, and will cite intentions to adopt these behaviors.

Our findings also converge with the longitudinal results of Bogg et al. (2025), who demonstrated that socio-political beliefs and dispositional traits predicted COVID-19 booster vaccination indirectly through belief-based processes, such as intentions and prior vaccination propensity. Together, these findings reinforce the proposition of the disposition–belief–motivation framework that distal individual differences shape health behaviors primarily through their effects on belief-based motivational mechanisms.

Effects of Dispositions on Behavior and Behavioral Trajectories

An important innovation of the current analysis was the multiple behavior follow-up and capacity to model trajectories in behavior over a key segment of the time course of the COVID-19 pandemic. Broadly speaking, our findings yielded a pattern of effects to suggest that the dispositions tended to be associated with initial uptake of the panel of COVID-19 preventive

behavior at baseline, but not subsequent trajectories in behavior over time. This departure represents an important contribution to current knowledge given that prior research examining the prediction of COVID-19 preventive behaviors, and health behaviors more broadly, has tended to adopt relatively short-term behavioral follow-up and not to model actual behavior change over time. Such 'shortitudinal' approaches to examining the determinants of behavioral outcomes in health contexts, including COVID-19, represent a considerable limitation that the current research addresses (c.f., Lance & Griggs, 2025).

Furthermore, the fact trajectories in health behavior do not appear to depend on personality traits or institutional trust suggest that other, unmeasured determinants may be responsible for behavioral maintenance. To speculate, such determinants may relate to social structure and other context-tied determinants that may be beyond the control of the individual, or other constructs that represent processes that are unspecified or unaccounted for in the current theoretical approach. For example, there is a growing body of research indicating that constructs such as habit and implicit attitudes representing spontaneous, non-conscious processes that lead to action have effects on health behaviors in the short and, particularly, the long term, after behavioral patterns have been formed (e.g., Hagger et al., 2023; Rebar et al., 2016). Effects of these constructs are considered somewhat independent of the effects of constructs representing reasoned processes that tend to be reflected in the belief-based social cognition constructs and intentions that were the focus in the current model test. We look to future investigations that adopt a broader scope of determinants within an integrated framework to test these speculative alternatives that may provide an account of variance in COVID-19 preventive behavior trajectories over time.

Strengths, Limitations and Future Directions

There are severable notable strengths of the current analysis and the contribution it makes to current theoretical and practical knowledge on the determinants of COVID-19 prevention behaviors and the ongoing management of COVID-19 infections and outbreaks in the endemic phase of the virus as well as management of future viruses that may reach pandemic levels.

While many studies have investigated factors associated with adherence to preventive behaviors during the pandemic (e.g., Abakoumkin et al., 2023; Dekeyser et al., 2023; Douglas et al., 2023; Enea et al., 2023; Keng et al., 2022; Schumpe et al., 2022; Stroebe et al., 2021), a major strength of the present work lies in the adoption of an integrated theoretical model that not only provides a broader perspective on the determinants of preventive actions but also elucidates the mechanisms involved, particularly how dispositional, trait-like constructs relate to intentions and behavior. Additional strengths include the use of a longitudinal design with multiple behavioral follow-up occasions selection of a sample of Belgian residents whose demographic profile closely matches that of the population. Nonetheless, the study is not without limitations, which we outline next, along with suggestions for future research to address or mitigate these concerns.

First, while we adopted robust and reliable validated self-report scales to measure the relevant preventive behaviors (Wollast et al., 2023), with attention to the salient contexts and social situations in which the behaviors are likely to occur, a general reliance on self-reported behavior may be a source of biases. For example, participants may under- or over-estimate their behavioral adherence due to poor recall or when the behavior is socially desirable. As a consequence, future corroboration of the current findings is needed in studies that complement self-report behavior measures with non-self-report alternatives, such as data from wearable

devices or observational studies, may reduce error variance and increase the precision of effect estimates.

Second, although we utilized a longitudinal design, the four-month follow-up period may not be sufficient to capture long-term dynamic changes in adherence to the current set of behaviors. Future studies should test the current model across a longer time period to examine whether the patterns hold. This is particularly important as public health guidelines evolve in response to new health threats and may further affect change in adherence and individuals' beliefs and other determinants implicated in decisions to persist with these behaviors. Further, alternative methodological approaches, such as group-based trajectory modeling exploring heterogeneity in health behavior adherence may be better suited to capture variations in adherence and be more effective in highlighting vulnerable groups who face challenges to adherence and may require specific, tailored interventions (Wollast et al., 2023). Alongside this, our current approach also measured the dispositional and belief-based social cognition constructs at a single time point and focused on their effects on future behavior. While this has value, it is also likely that the determinants identified in the current model, particularly those that are more state-like and subject to change like the belief-based social cognition constructs and intentions, are also likely to be affected by new information and context change that arise over time. As a consequence, future research should aim to include multiple measures of the determinants over time and, importantly, examine the extent to which trajectories of change in these constructs over time coincide with trajectories of change in behavior, consistent with approaches testing models in other health behavior contexts (e.g., Hagger & Hamilton, 2024), including COVID-19 preventive behaviors (e.g., Hagger et al., 2022).

Third, although we adopted a longitudinal study design that permitted us to model change in behavior trajectory over time, the current data are correlational. As such, inference of causal effects is contraindicated and the specified direction of effects in the model in the current analysis is derived from theory alone not the data. It stands to reason, then, that future research should consider further corroboration of the observed effects in studies adopting randomized designs that examine effects of manipulations or intervention techniques purposed to affect change in key model determinants (e.g., persuasive communications targeting attitude change by highlighting the value of preventive behaviors in producing salient outcomes such as reducing likelihood of lockdowns or reducing risk to vulnerable others; Hamilton & Johnson, 2020) on intentions and subsequent behavior.

Fourth, our model was not tested in relation to vaccine uptake or hesitancy, which represented an important public health behavior during the COVID-19 pandemic. While we believe that the disposition–belief–motivation framework could extend to vaccination decisions, the pattern of effects may differ. For example, conscientiousness and institutional trust would be expected to show positive associations with vaccine intentions and uptake, whereas extraversion may operate differently, as vaccination facilitates rather than restricts social engagement. Future research should examine whether the present model generalizes to vaccine-related outcomes.

A fifth limitation of the present study is that we did not include agreeableness (or other personality traits) in our model, despite evidence that this trait is positively associated with adherence to COVID-19 preventive behaviors, particularly social distancing (Moore et al., 2022). Future research should examine whether agreeableness also operates through TPB pathways or contributes unique predictive value beyond conscientiousness and extraversion.

Finally, our support for the predictions of the current model with respect to intentions should be confined to the current sample, with some tentative implications for the broader national context given that the sample corresponded well to the demography of the wider Belgian population. However, we would be loath to extrapolate current findings beyond the current national context, and we advocate replication of the current model test in other national samples to permit cross-national comparisons with the patterns of effect observed here.

Conclusion

In the current study, we present a robust analysis lending support to the predictions of a novel integrated theoretical model in which dispositional, namely conscientiousness and extraversion personality traits, serve as determinants of intentions to perform, and initial adoption of, COVID-19 preventive behaviors mediated by belief-based constructs, namely, attitude, subjective norm, and perceived behavioral control, from a leading social cognition theory. Our research also tested the effects of these constructs as determinants of trajectories in these behaviors over time, which has not been the norm in predictive research on determinants in this context, although our findings indicated that the model did not have efficacy in accounting for variance for these behavioral trajectories. The research contributes to a growing knowledge base on the determinants of intentions and behavioral uptake to perform COVID-19 preventive behaviors and a proposed mechanism involved. Specifically, the generalized advantages that traits like conscientiousness offer to individuals (e.g., better planning, action orientations toward engaging in goal-directed behaviors) is implicated in their intentions to perform and adoption of behaviors in this context, and indicates individuals likely strategically align their beliefs, represented by their attitudes, subjective norms, and perceived behavioral control, to engage in behaviors to produce outcomes relevant to health goals. Conversely, individuals endorsing

extraversion are more likely to be disinclined to intend to perform these behaviors, and report low beliefs in the efficacy of these behaviors and their capacity to perform them, likely due to a tendency to view these behaviors as an obstruction to social interaction and fulfilling social needs. In addition, trust in institutions served as an indirect determinant of preventive behavior intentions and adoption, indicating that such tendencies signal greater confidence and reassurance with respect to the value and efficacy of these behaviors reflected in their beliefs. However, that the current model was unable to account for substantive variance in preventive behavior trajectories is a concern, and we look to future research that seeks to explain this apparent boundary condition of the model, perhaps by incorporating constructs that may implicate other salient processes or model change in the determinants themselves alongside the change in the behavior. Nevertheless, current fundings should add to evidence on determinants and processes relevant to ongoing behavioral means to manage COVID-19 infection rates, and contribute to efforts to identify candidate targets for intervention strategies such as persuasive communications that may have efficacy in prevention.

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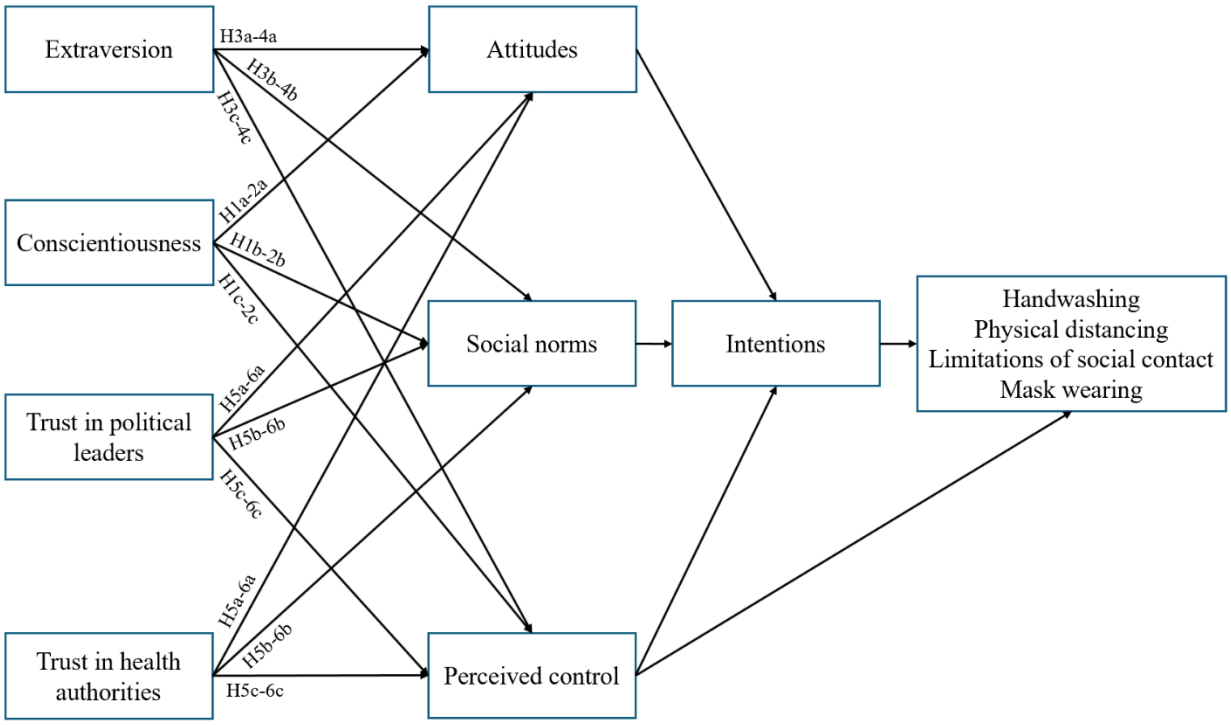

Figure 1. *Diagrammatic Representation of the Proposed Effects of the Integrated Theoretical Model Based on a Disposition-Belief-Motivation Framework.*

Table 1

Results of Latent Growth Curve Analyses for Each Health Behavior.

Behavior	Intercept		Slope		I-S Corr
	β	SE	β	SE	
Physical distancing (7-item)	.713	.006	-.045	.001	-.061
Handwashing (7-item)	.651	.006	-.017	.001	-.042
Limiting social contact (7-item)	.713	.006	-.043	.001	-.174
Limiting social contact (5-item)	.754	.007	-.047	.001	-.097
Mask wearing (7-item)	.763	.007	-.041	.001	-.175

Note. All coefficients (β) were statistically significant, $p < .001$. β = Standardized regression coefficient; SE = Standard error; I-S Corr = Intercept-slope correlation (standardized covariance estimate).

Table 2

Indirect Effects connected to hypotheses. See Table SI6 for full list of indirect effects.

Path	Physical Distancing			Handwashing			Limiting social contact			Mask wearing		
	β	SE	*p*	β	SE	*p*	β	SE	*p*	β	SE	*p*
C→A→I	**.021**	**.010**	**.038**	**.021**	**.010**	**.040**	.017	.012	.162	.019	.012	.096
C→SN→I	.016	.009	.059	**.021**	**.008**	**.009**	.015	.011	.177	.018	.010	.073
C→PBC→I	.007	.013	.582	**.036**	**.012**	**.002**	.015	.017	.372	.015	.018	.400
C→A→I→Bi	.005	.003	.053	**.007**	**.003**	**.049**	.004	.003	.181	.006	.004	.109
C→SN→I→Bi	.004	.002	.071	**.007**	**.003**	**.015**	.004	.005	.375	.006	.003	.084
C→PBC→I→Bi	.002	.004	.588	**.012**	**.004**	**.004**	.011	.006	.074	.005	.006	.410
C→A→I→Bs	.000	.000	.983	-.000	.000	.335	-.000	.000	.948	-.000	.000	.371
C→SN→I→Bs	.000	.000	.983	-.000	.000	.292	-.000	.000	.949	-.000	.000	.346
C→PBC→I→Bs	.000	.000	.991	-.000	.000	.272	-.000	.000	.958	-.000	.000	.558
E→A→I	**-.038**	**.011**	**.001**	.005	.010	.597	**-.064**	**.014**	**<.001**	**-.023**	**.012**	**.035**
E→SN→I	**-.025**	**.009**	**.008**	-.011	.009	.200	**-.064**	**.014**	**<.001**	**-.028**	**.011**	**.009**
E→PBC→I	**-.062**	**.016**	**<.001**	-.003	.012	.825	**-.122**	**.021**	**<.001**	**-.052**	**.019**	**.007**
E→A→I→Bi	**-.010**	**.003**	**.002**	-.002	.003	.602	**-.019**	**.005**	**<.001**	**-.008**	**.004**	**.046**
E→N→I→Bi	**-.006**	**.003**	**.014**	-.004	.003	.207	**-.019**	**.004**	**<.001**	**-.009**	**.004**	**.017**
E→PC→I→Bi	**-.016**	**.005**	**.001**	-.001	.004	.826	**-.036**	**.007**	**<.001**	**-.016**	**.006**	**.012**
E→A→I→Bs	-.000	.000	.982	-.000	.000	.694	.000	.001	.938	.000	.000	.303
E→SN→I→Bs	-.000	.000	.983	.000	.000	.427	.000	.001	.938	.000	.000	.274
E→PBC→I→Bs	-.000	.001	.982	.000	.000	.864	.000	.001	.938	.001	.001	.274
P→A→I	**.037**	**.010**	**<.001**	**.024**	**.009**	**.008**	**.071**	**.014**	**<.001**	**.060**	**.012**	**<.001**
P→SN→I	**.031**	**.009**	**<.001**	**.017**	**.008**	**.029**	**.058**	**.012**	**<.001**	**.040**	**.011**	**<.001**
P→PBC→I	**.053**	**.014**	**<.001**	.014	.010	.175	**.050**	**.017**	**.004**	**.077**	**.019**	**<.001**
P→A→I→Bi	**.010**	**.003**	**.001**	**.008**	**.003**	**.013**	**.021**	**.005**	**<.001**	**.018**	**.005**	**<.001**
P→SN→I→Bi	**.008**	**.003**	**.001**	**.006**	**.003**	**.035**	**.017**	**.004**	**<.001**	**.012**	**.004**	**.001**
P→PBC→I→Bi	**.014**	**.004**	**.001**	.005	.003	.181	**.015**	**.005**	**.007**	**.024**	**.007**	**<.001**
P→A→I→Bs	.000	.000	.982	-.000	.000	.287	-.000	.001	.937	-.001	.001	.230
P→N→I→Bs	.000	.000	.982	-.000	.000	.313	-.000	.000	.938	-.001	.000	.246
P→PBC→I→Bs	.000	.001	.982	-.000	.000	.412	-.000	.000	.940	-.001	.001	.238
H→A→I	**.144**	**.021**	**<.001**	**.074**	**.013**	**<.001**	**.188**	**.021**	**<.001**	**.192**	**.022**	**<.001**

H→SN→I	**.103**	**.016**	**<.001**	**.054**	**.011**	**<.001**	**.136**	**.017**	**<.001**	**.136**	**.017**	**<.001**
H→PBC→I	**.091**	**.017**	**<.001**	**.044**	**.012**	**<.001**	**.078**	**.017**	**<.001**	**.160**	**.023**	**<.001**
H→A→I→Bi	**.038**	**.008**	**<.001**	**.024**	**.005**	**<.001**	**.056**	**.008**	**<.001**	**.059**	**.010**	**<.001**
H→SN→I→Bi	**.027**	**.006**	**<.001**	**.018**	**.004**	**<.001**	**.040**	**.006**	**<.001**	**.042**	**.008**	**<.001**
H→PBC→I→Bi	**.024**	**.006**	**<.001**	**.014**	**.004**	**.001**	**.023**	**.005**	**<.001**	**.049**	**.009**	**<.001**
H→A→I→Bs	.000	.002	.982	-.001	.001	.230	-.000	.002	.937	-.003	.002	.212
H→SN→I→Bs	.000	.001	.982	-.001	.001	.237	-.000	.001	.937	-.002	.001	.215
H→PBC→I→Bs	.000	.001	.982	-.001	.001	.252	-.000	.001	.938	-.002	.002	.214

Note. C = Conscientiousness; E = Extraversion; P = Political trust; H = Trust in health experts; A = Attitudes; SN = Subjective norms; PBC = Perceived behavioral control; I = Intentions, Bi=Behavior intercept, Bs=Behavior slope. Arrows denote tested sequences. H→A→I→Bs, for example, indicates a test of trust in health experts' effect on individual-level behavioral slopes as serially mediated by attitudes toward the behavior, followed by behavioral intentions.