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Predictors of belief in conspiracy theory: The role of individual differences in schizotypal traits, paranormal beliefs, social dominance orientation, right wing authoritarianism and conspiracy mentality^{*}

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ABSTRACT

Many different predictors for belief in conspiracy theories have been empirically validated in different studies. The current study considers the relative contribution of individual differences in dimensions of schizotypal personality, social dominance orientation (SDO), right wing authoritarianism (RWA), paranormal beliefs (PB) and the newer construct of conspiracy mentality (CM) on belief in conspiracy theories. For predicting belief in specific conspiracy theories, we applied Path analyses with a large convenience sample (N=883, 62% women) of students from Norway, a highly gender egalitarian country, allowing us to consider the effects of mediators and gender moderation in a specified model. Schizotypal personality dimensions Odd Beliefs and Paranoid Ideation predicted different mediators, and their effects on belief in conspiracy theories were totally mediated. The mediating variables (SDO, RWA, PB, and CM) were all unique predictors of belief in conspiracy theories, with CM having the largest contribution for both sexes. Explorative analyses of the specified model across gender suggest that the model for men and women is not equivalent. Results are discussed in light of the predictive contribution of especially conspiracy mentality.

1. Introduction

International research into belief in conspiracy theories and conspiracy culture has seen explosive growth during the last decade (see Butter & Knight, 2020). It has become increasingly clear that belief in conspiracy theories is part of normal human psychology and built on necessary human capacities (Brotherton, 2015). Conspiracy beliefs may be evoked by situational factors such as response to fear and uncertainty (van Prooijen, 2018), and seem broadly tied to apprehension, aversion behavior, and magical thinking (Oliver & Wood, 2018). They are primarily social phenomena, often tied to in-group identification, and as such, a form of collective, motivated cognition (Kreko, 2015). Conspiracy theories are widely distributed in most populations and found across the political spectrum (Oliver & Wood, 2014; Uscinski & Parent, 2014; cf. Van der Linden et al., 2020; van Prooijen et al., 2015).

While none of the big-five personality traits are found to be consistently associated with belief in conspiracy theories (Goreis & Voracek, 2019), such beliefs are still tied to individual differences. Basic

individual difference predictors of conspiracy beliefs include intuitive cognitive style, intentionality bias, anthropomorphism, and schizotypy (Barron et al., 2014; Barron et al., 2018; Brotherton & French 2015). Some people show a stronger, general tendency to utilize conspiracy as an explanation. People who believe in one conspiracy theory are more likely to believe in another (e.g., Bruder et al., 2013), even fictive theories minted for the occasion (e.g., Swami et al., 2011), and in theories that are mutually contradictory (Wood, Douglas & Sutton 2012).

In a series of investigations, Bruder et al. (2013) showed that scores on Conspiracy Mentality (CM)—a construct of generalized political attitude—strongly predicted belief in specific conspiracy theories. It did so differently from, and better than, paranoid ideation (Bruder et al., 2013), Right-Wing Authoritarianism (RWA) and Social Dominance Orientation (SDO) (Imhoff & Bruder, 2014). Others have also shown that a range of questions aiming at a general predisposition towards the kind of distrustful, intentionalistic thinking associated with conspiracy theories strongly predicts the likelihood that respondents will ascribe conspiratorial tendencies to specific actors (e.g., Brotherton et al., 2013;

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Lantian et al., 2016).

The Conspiracy Mentality measure was focused specifically on assumptions that the *powerful* are engaging in conspiracy. Imhoff and Bruder (2014) argued that where RWA better predicts negative attitudes to those seen to deviate from and threaten norms and SDO negative attitudes to those low in the social hierarchy, CM uniquely predicts conspiracy beliefs and prejudices directed against actors who are socially encoded as powerful. In contrast to the system-justifying attitudes of RWA and SDO, CM is presented as challenging "existing power structures in society" (Imhoff & Bruder, 2014). Although the three predicted distinctive patterns of prejudice, they were positively correlated at a small to moderate degree.

Other and alternative measures of Conspiracy Mentality have also been shown to correlate with paranormal beliefs and schizotypal features (e.g., Barron et al., 2014; Lobato et al., 2014). Lobato et al. (2014) found no separate contribution from schizotypy when controlling for delusional ideation, and Barron et al. (2014) found that the main predictive dimension of schizotypy is 'Odd beliefs and magical thinking'. Relatedly, Oliver and Wood (2014) found that on the socio-cultural level, dualism and end time-beliefs contribute strongly to conspiracy thinking. This was associated with a preference for intuitive over analytic thinking style. Intuitive and somewhat disorganized, holistic thinking seems to be linked to schizotypy, paranormal beliefs and conspiracy mentality (Barron et al., 2018; Wood & Douglas 2018).

Paranormal belief seems more prevalent among women (Aarnio & Lindeman, 2005), while men score higher on social dominance orientation (Kleppestø et al., 2019; Sidanius & Pratto, 1999). This could indicate differences in pathways to belief in conspiracy theories. It could also influence levels of beliefs in theories more strongly predicted by variously paranormal beliefs or SDO (Dyrendal et al., 2017), and against common stereotypes, early and small studies (Darwin et al., 2011; Swami et al., 2010) reported that women were more prone to conspiracy beliefs than men. This would fit with women being more likely to hold paranormal beliefs, as well as with the observation that group experience with discrimination predicts conspiracy thinking (e.g. Thorburn Bird & Bogart, 2003). However, other early studies (e.g., SWagner-Egger & Bangerter 2007) and later, larger studies (e.g. Bruder et al., 2013; Oliver & Wood, 2014) find no reliable effect of sex.

There are challenges concerning the factorial validity of the different scales measuring the general propensity towards belief in conspiracy theories (Swami et al., 2017), especially when applied in different cultural contexts (Atari et al., 2019). Nevertheless, these various measures generally predict belief in specific conspiracy theories well, with Conspiracy Mentality performing best although the association between CM and belief in specific conspiracy theories shows cultural variation,

relating to trust and power differences (Bruder et al., 2013). This is the first systematic study in Norway, a high-trust society with high egalitarian ideals and among the most gender-equal nations in the world (see UN Gender Inequality Index). These cultural factors have the potential to modulate both the levels of belief in specific conspiracy theories and the intermediate-level mechanisms by which they are formed. Norway is therefore an interesting case on which to test earlier results.

2. Aims and a theoretical model

In the current study, we test the relationships between a set of central validated predictors of belief in conspiracy theories, including schizotypal traits, paranormal beliefs, RWA, SDO, and conspiracy mentality. We will be testing a theoretical model based upon previous studies using a large sample of students from a gender egalitarian country, Norway. In the model, we consider the primary effects of normal variation of schizotypal traits on belief in specific conspiracy theories, mediated by the effects of conspiracy mentality, paranormal beliefs, right wing authoritarianism, and social dominance orientation (see Fig. 1). This will provide a comprehensive test of the relationships between several of the important, empirically validated predictors. Despite not having grounds for predicting sex differences, the model will be run for each sex separately, to explore whether the model is similar for men and women.

2.1. Schizotypal personality

Higher score on standardized questions measuring schizotypal traits, in this context degree of eccentric and paranoid ideation, rather than as a formal diagnosis of personality disorder, has shown itself a reliable predictor of belief in conspiracy theories (Barron et al., 2018; Darwin et al., 2011). For schizotypal traits, the dimension 'Odd beliefs and magical thinking' should be the primary predictors of belief in conspiracy theories (Barron et al., 2014), with Paranoid ideation being a second predictor (Bruder et al., 2013, Study 2; Darwin et al., 2011; Dagnall et al., 2015).

2.2. Mediators

2.2.1. Paranormal beliefs

Higher score on paranormal beliefs should correlate with belief in conspiracy theories (Darwin et al., 2011; Dyrendal et al., 2017). Both are examples of what may be defined as epistemically unwarranted beliefs (Lobato et al., 2014; Stone et al., 2018) drawing upon intuitive and magical thinking (Oliver & Wood, 2018), and tendencies towards core ontological confusions (Rizeq et al., 2020).

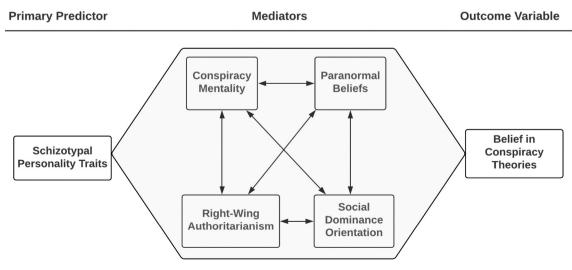


Fig. 1. A theoretical model for testing the relationships between schizotypal personality traits and specific conspiracy theories with possible mediators.

2.2.2. Generalized political attitudes

We employ three scales of generalized political attitudes: conspiracy mentality, RWA, and SDO (Imhoff & Bruder, 2014). We will explore whether higher score on conspiracy mentality (CM) will correlate with scores on belief in known conspiracy theories, and given the content of the selected conspiracy theories, better than SDO, RWA, and paranormal beliefs (Bruder et al., 2013; Imhoff & Bruder, 2014).

3. Method

3.1. Participants and procedure

The survey was conducted during the autumn of 2016. A questionnaire was handed out at lectures or during breaks to students enrolled in ten different faculties at a large Norwegian university. Participation was anonymous and voluntary. Students completed questionnaires at their own pace.

We received 911 forms, discarding 20 for being incomplete. Data were carefully screened for monotony and inconsistencies, leaving n=883 (97.5%) eligible for analyses (336 men, 547 women). Year of study rather than age was recorded. Two-thirds of the participants reported being first-year students (freshmen), and the average years of study was 1.8 years (range 1–6). The study of natural sciences was more common for men (52%) than for women (16%).

3.2. Measures

Schizotypal Personality was measured using a modified version of the Schizotypal Personality Questionnaire-Brief (SPQ-B; Raine & Benishay, 1995). The participants rated their belief frequency on a 7-point Likert scale with anchors, 1 (Never) and 7 (Very frequent), unlike the original 'yes'/'no' format. Because previous studies have shown that only the dimensions "odd beliefs and magical thinking" and "paranoid ideation" of schizotypal traits predict conspiracy beliefs (e.g., Barron et al., 2014; Darwin et al., 2011) we applied only items that reflect these types of thinking; Unusual/odd perceptual experiences (3 items) and the Paranoid Ideation (5 items). Internal consistency was acceptable for both scales (Odd beliefs: $\alpha=0.71$ and Paranoid ideation: $\alpha=0.72$). Item scores were averaged.

For measuring *Conspiracy Mentality*, we applied a 5-item Conspiracy Mentality Questionnaire developed by Bruder et al. (2013). The participants rated their level of agreement on each statement on a 7-point Likert scale with anchors, 1 (*Strongly disagree*) and 7 (*Strongly agree*). Internal consistency was good ($\alpha = 0.85$). Item scores were averaged.

Paranormal Beliefs was measured with a 17-item questionnaire inspired by earlier, Scandinavian research (e.g., Granqvist & Hagekull, 2001). The participants rated their level of agreement on each statement on a 7-point Likert scale with anchors, 1 (Strongly disagree) and 7 (Strongly agree). Internal consistency was good ($\alpha=0.86$). Item scores were averaged.

Right-Wing Authoritarianism (RWA) was measured by applying a slightly modified 15-items version of Zakrisson's (2005) RWA-scale adopted for Scandinavian samples. One item with explicit reference to the Bible was slightly rephrased in order to measure relevant responses among Muslim students. The participants rated their level of agreement on each statement on the same 7-point Likert scale as above. Internal consistency was acceptable ($\alpha=0.72$). Item scores were averaged.

Social Dominance Orientation was measured applying a 16-item scale developed by Sidanius and Pratto (1999). The participants rated their level of agreement with each statement on the same 7-point Likert scales as above. Internal consistency was good ($\alpha=0.89$). Item scores were averaged.

For measuring belief in specific *Conspiracy Theories*, we constructed an 18-items scale for this study based on theories circulating in Norwegian conspiracy culture at the time. The scale was designed to cover the political spectrum and the items were diversified so that they should

not appeal overwhelmingly to one of the sexes. Sample items read: "The financial crisis was coordinated by a small elite within the financial business", and "A secret group uses popular music to brainwash young people." The participant rated their level of agreement with each statement on the same 7-point Likert scales as above. Two items concerning minorities (Jews and Muslims) and two actual, historical conspiracies were removed (see Appendix A for a detailed wording of the 14 items included in the scale). Internal consistency for the remaining 14 items was good ($\alpha=0.83$). The item scores were summed and averaged. Higher scores represent stronger beliefs in specific conspiracy theories.

3.3. Analyses

For analyses of simple sex difference, we performed t-tests and calculated Cohen's d assuming unequal variances. For measuring associations between variables, we report zero-order (Pearson's r) separately for men and women. For predicting specific conspiracy theories for the outlined model (Fig. 1), we applied Path analysis using Structural Equation Modelling in Stata/MP 16.1 for Mac (StataCorp, 2019). Estimation method was maximum likelihood with robust estimation of standard errors. Path analysis is an extension of the regression model for observed variables. Path analysis permits a complete test of a specified model with groups and mediators. Stata allows for direct tests of moderation effects through tests for group (men vs. women) invariance of parameters. This analysis performs Ward tests and returns Chi-Square values.

4. Results

4.1. Sex differences and correlations

General agreement with the 14 conspiracy theories was low, and men and women did not differ in their overall ratings of belief in specific conspiracy theories (see Table 1). Women reported significantly more schizotypal odd beliefs than men, while men reported significantly more schizotypal paranoid ideation than women. When we apply Cohen's conventions for effect sizes, these sex differences were small. Further, men reported somewhat higher conspiracy mentality than women, while women reported more paranormal beliefs (medium effect) than men. Regarding social dominance orientation, men agreed moderately more with the statements than women. Finally, women's overall ratings

Table 1
Means and SDs, and tests of sex differences for the variables in the model.

| Variable | Men | | Women | | Test of sex differences | | |
|-------------------------------------|------|------|-------|------|-------------------------|----------------------------|--|
| | M | SD | M | SD | T | d [95% CI] | |
| Schizotypal odd beliefs | 1.69 | 0.92 | 2.00 | 1.14 | -4.20*** | -0.29 [-0.43, -0.15] | |
| Schizotypal paranoid ideation | 2.29 | 0.87 | 2.11 | 0.92 | 2.88** | 0.20 [0.06, 0.34] | |
| Conspiracy mentality | 3.13 | 1.26 | 2.85 | 1.10 | 3.34*** | 0.23 [0.10, 0.37] | |
| Paranormal beliefs | 2.10 | 0.90 | 2.55 | 0.92 | -7.08*** | -0.49 [-0.63, -0.35] | |
| Right-wing authoritarian | 2.87 | 0.75 | 3.02 | 0.68 | -3.09** | -0.22 [-0.35, -0.08] | |
| Social dominance orientation | 2.45 | 1.08 | 2.04 | 0.82 | 6.23*** | 0.43 [0.30, 0.57] | |
| Belief in conspiracy theories | 2.18 | 0.94 | 2.29 | 0.81 | -1.74 | -0.12 [-0.26, 0.02] | |

Note. * *p < .05, * *p < .01, * *p < .001. Likert scoring with anchors 1 (Strongly disagree) and 7 (Strongly agree) was applied for all items. Level of skewness was low for Belief in Conspiracy Theories (+0.98). Hence, the variable was not subject to log-transformation.

on right-wing authoritarianism were slightly higher than men's ratings.

Next, we looked at the association among the variables for men and women separately. As shown in Table 2, belief in specific conspiracy theories was strongly correlated with conspiracy mentality, paranormal beliefs, and right-wing authoritarianism, and moderately correlated with schizotypal odd beliefs, schizotypal paranoid ideation, and social dominance. Associations among the predictors showed a particularly strong correlation between paranormal beliefs and schizotypal odd beliefs ($r_{\text{men}} = 0.60$, $r_{\text{women}} = 0.57$), while the association between paranormal beliefs and schizotypal paranoid ideation was moderate ($r_{men} =$ 0.24, $r_{\rm women} = 0.33$). Social dominance orientation showed no association with schizotypal paranoid ideation, and right-wing authoritarianism showed very small associations with the schizotypal scales. The remaining associations were of moderate strength. With a few exceptions, the associations appeared to be similarly strong for the two sexes, but the tests of sex differences in associations (parameters) will be presented below.

4.2. Predictors of beliefs in specific conspiracy theories for men and women

For predicting Belief in conspiracy theories, we applied the following analytic strategy: First, we ran a simple model without any of the mediators in Fig. 1. Second, we added the four mediators in a *multiple mediation model* (Preacher & Hayes, 2008) allowing the residuals among these endogenous variables to correlate. Finally, we removed all nonsignificant paths from the model, and report on the final model fit. For all analyses, sex of participant is the grouping variable, and tests of parameter invariance are performed to identify what paths differ significantly for men and women.

The simple model with only the schizotypal variables as predictors showed that schizotypal odd beliefs ($\beta=0.21$) and schizotypal paranoid ideation ($\beta=0.16$) were both significant predictors of belief in conspiracy theories for women, but only schizotypal odd beliefs ($\beta=0.35$) significantly predicted conspiracy theories for men. The two schizotypal variables accounted for 14.5% and 9.9% of the variance in men and women respectively. The test of group parameter invariance revealed that the effect of schizotypal odd beliefs on conspiracy theories was significantly stronger for men than for women, $\chi^2(1)=5.02$, p=.025, and that the two schizotypal variables were significantly stronger intercorrelated for women ($\beta=0.47$) than for men ($\beta=0.35$), $\chi^2(1)=5.19$, p=.023.

The second model showed no direct effect of the schizotypal variables on belief in conspiracy theories when the effects of the four mediators were accounted for. Hence, the effect of schizotypal personality traits on conspiracy theories was totally mediated. In addition, the schizotypal odd beliefs variable was unrelated to social dominance orientation, and schizotypal paranoid ideation was unrelated to both paranormal beliefs and right-wing authoritarianism. We identified five

Table 2 Zero-order (Pearson's r) correlations among variables. Men (n=309) above the diagonal, women (n=522) below the diagonal.

| Variable | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|--|------|------|------|------|------|------|------|
| 1. Schizotypal odd beliefs | - | 0.35 | 0.30 | 0.60 | 0.31 | 0.09 | 0.38 |
| Schizotypal paranoid ideation | 0.47 | - | 0.31 | 0.24 | 0.08 | 0.15 | 0.20 |
| 3. Conspiracy mentality | 0.38 | 0.44 | _ | 0.41 | 0.25 | 0.28 | 0.58 |
| 4. Paranormal beliefs | 0.57 | 0.33 | 0.44 | _ | 0.48 | 0.17 | 0.58 |
| Social dominance orientation | 0.21 | 0.05 | 0.19 | 0.38 | - | 0.39 | 0.44 |
| 6. Right-wing authoritarianism | 0.09 | 0.11 | 0.16 | 0.27 | 0.44 | - | 0.38 |
| 7. Belief in conspiracy theories | 0.28 | 0.26 | 0.50 | 0.45 | 0.46 | 0.33 | - |

Note. Year of study and faculty (natural sciences, no/yes) were not associated with any of the variables.

significant differences in associations between men and women suggesting that the model was not identical for the two sexes (i.e., gender moderation). The effect of paranormal beliefs on conspiracy theories was stronger for men, $\chi^2(1) = 11.01$, p < .001, the effect of RWA on conspiracy theories was stronger for women, $\chi^2(1) = 6.20$, p = .013, the effect of schizotypal odd beliefs on RWA was stronger for men, $\chi^2(1) =$ 5.89, p = .015, conspiracy mentality was more strongly associated with social dominance for men, $\chi^2(1) = 6.53$, p = .011, and finally, as in the simple model, the two schizotypal variables were more strongly associated for women. The final model is presented in Fig. 2 with the insignificant paths removed for men and women. The model fit was good, $\chi^2(10) = 12.25$, p = .269, RMSEA = 0.023 [0.000, 0.061], CFI = 0.998, TLI = 0.994, SRMR = 0.018. Overall, the variables in the model accounted for a sizable proportion of variance in belief in conspiracy theories $(R^2_{\text{men}} = 0.525, R^2_{\text{women}} = 0.417)$. Further, the model accounted for more than 30% of the variance in paranormal beliefs for both sexes ($R^2_{\text{men}} = 0.351$, $R^2_{\text{women}} = 0.323$), and 13.0% and 21.9% of the variance in conspiracy mentality for men and women, respectively. For men, the best predictors of belief in conspiracy theories were conspiracy mentality ($\beta = 0.36$) and paranormal beliefs ($\beta = 0.35$). For women, the best predictors were conspiracy mentality ($\beta = 0.36$) and right-wing authoritarianism ($\beta = 0.30$). Finally, and we left conspiracy mentality out on the model. This omission reduced the explained variance in conspiracy theories by approximately 10% ($R^2_{men} = 0.425$, $R^2_{\text{women}} = 0.309$).

5. Discussion

In a path model we tested the relative contribution of fundamental personality variables (individual differences in the normal range of tendency towards odd beliefs and paranoid ideation) and mediators (RWA, SDO, paranormal beliefs, and the recently developed construct conspiracy mentality) on the participants' belief in 14 specific conspiracy theories. The personality factors were fully mediated by RWA, SDO, paranormal beliefs, and conspiracy mentality. Specifically, paranoid ideation was mediated by SDO and conspiracy mentality, and odd beliefs by RWA, conspiracy mentality, and paranormal beliefs. The tested path model provides a more comprehensive framework for understanding the possible associations between relevant personality factors, generalized political attitudes, paranormal beliefs, and conspiracy mentality, and belief in conspiracy theories than prior studies. Each of the four mediating variables predicted belief in specific conspiracy theories, but conspiracy mentality was the strongest and most consistent predictor regardless of participant sex.

Despite the use of different scales, the correlation between odd beliefs and authoritarian attitudes is comparable to prior studies (Oliver & Wood, 2018; Stojanov et al., 2019). Different from Wilson and Rose (2014), the association between RWA and paranoid ideation was very weak in our sample, and our study does not support some earlier findings that odd beliefs predict belief in conspiracy theories directly (Barron et al., 2014; Lobato et al., 2014). Barron et al. (2014, 2018) argued that there is no clear conceptual difference between odd beliefs and facets of paranormal beliefs relating to hidden agency, and that this close relationship may point to differential traits that lead people to also hold beliefs in conspiracy theories. Our study supports this, but also points to other, more conceptually separate mediators.

Our results seem to support considering conspiracy mentality as a mentality in the sense of a mediating, differential trait between personality and attitudes, expressing a generalized propensity towards thinking in terms of conspiracy, more than being on par with other "generalized political attitudes". As predictor in our model, conspiracy mentality was the most important, accounting alone for an additional 10% of the explained variance in belief in specific conspiracy theories. The current study is in line with the findings of Imhoff and Bruder (2014) that conspiracy mentality better predicted belief in conspiracy theories than RWA and SDO. This is expected, especially since the

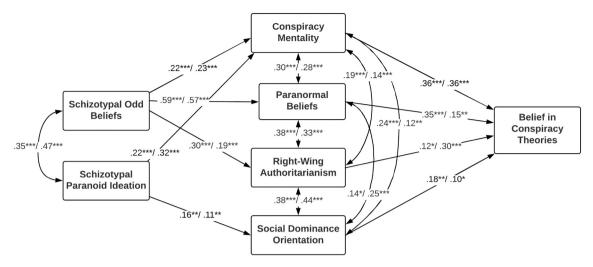


Fig. 2. Standardized path coefficients for belief in 14 specific conspiracy theories. *p < .05, **p < .01, ***p < .001. The final model includes only significant paths. Coefficients are presented as men/women. Covariances among mediators are the correlated residuals.

selected conspiracy theories included in the current study were all directed against powerful actors. This was exactly the type of conspiracy theories that Imhoff and Bruder (2014) found these to be best predicted by conspiracy mentality. This measure of general propensity for conspiracy thinking clearly performs as desired also with students from a high trust, social- and gender egalitarian culture.

Our findings join with a host of others that find no difference between men and women in belief in specific conspiracy theories. Nevertheless, we need to differentiate between sex differences in level of endorsement of variables and the association among these variables in the path model. As we cannot be certain that the current sample is representative, differences in level may not be of great interest. However, the associations among variables are less influenced by sample representativeness and weighting (Dey, 1997). The focus of the current study is the mediation model and whether the model is similar for men and women. In general, the model is highly equivalent, however there were some noteworthy differences: paranormal beliefs explained more variance for men, RWA for women. However, considering both the bivariate correlations where differences are small, and the specifications of the path model (allowing all mediators to correlate), we are uncertain how robust these sex differences actually will prove to be in future research. In addition, the low internal consistency of the RWA measure most likely reflects a lack of unidimensionality and quality of these attitudes and stand in contrast to the strong internal consistency of the SDO measure. For both men and women, the bivariate correlations showed that RWA was less associated with the outcome relative to the other mediators, and it is therefore unlikely that this attitude is particularly important for women in the prediction of belief in conspiracy theories.

Given the above, it's worth noting that the main path runs from schizotypal thinking via paranormal beliefs and especially conspiracy mentality to belief in specific conspiracy theories; a path that is similarly strong for men and women. Normal range variation in schizotypal odd beliefs was important for both paranormal beliefs and conspiracy thinking, while normal range variation in schizotypal paranoid ideation was relevant only for conspiracy mentality. Since conspiracy mentality and paranormal beliefs accounted for the effect of these divergent thinking styles, future research may benefit from looking less at schizotypy and rather consider other predictors of belief in conspiracy theories that may provide additional and unique explanatory power (see also Barron et al., 2018; Oliver & Wood, 2018). The path from divergent thinking styles to generalized political attitudes (RWA and SDO) was less robust but may still explain variance in conspiracy beliefs. As the connection between RWA and belief in conspiracy theories has also been

investigated more closely, future research may benefit from a stronger focus on SDO than RWA.

5.1. Limitations

In addition to the above limitations, strong inferences about causality or directionality of effects is not possible given the cross-sectional design. In such designs the problem of inflated associations for measures collected at the same time (i.e., common method variance; Lindell & Whitney, 2001; Podsakoff et al., 2003) remains unknown. Only a longitudinal design can resolve this. Further, the relatively low prevalence of belief in conspiracy theory (and the other study variables) may well be a result of sampling from a high-trust and highly gender egalitarian student population. Still, the sample was large and covered students across faculties including natural sciences. Also, response scales applied were all 7-point, providing more fine-grained measures. Skewness in the outcome variable was not an issue despite the low overall prevalence. Future research needs to consider whether the current model may be reproduced in samples of non-students and older participants.

6. Conclusions

The current study and the application of path model with multiple mediators provides insight into the relative contribution of individual differences in a normal sample of schizotypal personality traits, SDO, RWA, paranormal beliefs and conspiracy mentality. The findings suggest that the effect of schizotypal traits on beliefs in conspiracy theories was fully mediated by several intermediate factors. Especially, the effect of the newest construct, conspiracy mentality, is worth noting. This was the best predictor for both sexes and was in turn the only mediator predicted by both schizotypal personality dimensions. It is not merely the same as belief in conspiracy theories, albeit highly correlated, and it provides unique variance in competition with individual differences in political and religious constructs. Future research needs to investigate the ontogeny and maintenance of individual differences in conspiracy mentality. The reported sex differences within the model warrant further investigation. While we still need to garner further understanding of the construct, we find that conspiracy mentality is the best predictor of belief in specific conspiracy theories.

CRediT authorship contribution statement

Asbjørn Dyrendal: Conceptualization, Data collection, Writing. Leif Edward Ottesen Kennair: Conceptualization, Writing. Mons Bendixen: Statistical Analyses, Writing.

Declaration of competing interest

None.

Appendix A

Wording of the 14-Items Belief in Specific Conspiracy Theories. Reversed scores are marked (R).

- 1. The pharmaceutical industry keeps a natural cure for cancer secret, because they earn more money on dubious treatments.
- 2. The death of princess Diana was an accident (R)
- 3. The attacks on World Trade Center and Pentagon on September 11, 2001 were neither planned nor known in advance by American authorities (R)
- The financial crisis was coordinated by a small elite within the financial business.
- Anders Behring Breivik was part of a larger conspiracy controlled by outside forces.
- 6. Air traffic is used to spread harmful chemical substances ("chemtrails") in the sky as part of a secret program.
- 7. The murder of John F. Kennedy in 1963 was planned and executed by Lee Harvey Oswald, acting alone (R).
- 8. The Norwegian Institute for Public Health keeps secret information that the Norwegian vaccination program is hazardous to your health.
- 9. There is no secret world conspiracy named Illuminati (R)
- 10. A secret group uses popular music to brainwash young people.
- 11. The HIV-virus evolved naturally, and was not created artificially in laboratories (R)
- 12. The Labor party actively seeks to destroy the nuclear family and make Norway subservient to foreign powers.
- 13. Producers of cellular phones and the health authorities conceal the harmful effects of radiation from cellular phones.
- 14. Beliefs that climate change has human causes have been created to justify increased state control and is supported by scientists who want to make money.

References

- Aarnio, K., & Lindeman, M. (2005). Paranormal beliefs, education, and thinking styles. Personality and Individual Differences, 39(7), 1227–1236.
- Atari, M., Afhami, R., & Swami, V. (2019). Psychometric assessments of Persian translations of three measures of conspiracist beliefs. PLoS One, 14(4), Article e0215202. https://doi.org/10.1371/journal.pone.0215202.
- Barron, D., Furnham, A., Weis, L., Morgan, K. D., Towell, T., & Swami, V. (2018). The relationship between schizotypal facets and conspiracist beliefs via cognitive processes. *Psychiatry Research*, 259, 15–20.
- Barron, D., Morgan, K., Towell, T., Altemeyer, B., & Swami, V. (2014). Associations between schizotypy and conspiracist ideation. *Personality and Individual Differences*, 70, 156–159.
- Brotherton, R. (2015). Suspicious minds. Why we believe conspiracy theories. London: Bloomsbury Sigma.
- Brotherton, R., & French, C. C. (2015). Intention Seekers: Conspiracist Ideation and Biased Attributions of Intentionality. PLoS ONE, 10(5), e0124125. https://doi.org/ 10.1371/journal.pone.0124125.
- Brotherton, R., French, C. C., & Pickering, A. D. (2013). Measuring belief in conspiracy theories: The generic conspiracist beliefs scale. Frontiers in Psychology, 4, 279. https://doi.org/10.3389/fpsyg.2013.00279.
- Bruder, M., Haffke, P., Neave, N., Nouripanah, N., & Imhoff, R. (2013). Measuring individual differences in generic beliefs in conspiracy theories across cultures: Conspiracy Mentality Questionnaire. Frontiers in Psychology, 4, 225.
- Butter, M., & Knight, P. (Eds.). (2020). Routledge handbook of conspiracy theories. London:
- Dagnall, N., Drinkwater, K., Parker, A., Denovan, A., & Parton, M. (2015). Conspiracy theory and cognitive style: A worldview. Frontiers in Psychology, 6, 206. https://doi. org/10.3389/fpsyg.2015.00206.
- Darwin, H., Neave, N., & Holmes, J. (2011). Belief in conspiracy theories. The role of paranormal belief, paranoid ideation and schizotypy. *Personality and Individual Difference*, 50(8), 1289–1293.

- Dey, E. L. (1997). Working with low survey response rates: The efficacy of weighting adjustments. Research in Higher Education, 38, 215–227. https://doi.org/10.1023/A: 1024985704202.
- Dyrendal, A., Kennair, L. E. O., & Lewis, J. R. (2017). The role of conspiracy mentality and paranormal beliefs in predicting conspiracy beliefs among neopagans. *International Journal for the Study of New Religions*, 8(1), 73–97.
- Goreis, A., & Voracek, M. (2019). A systematic review and meta-analysis of psychological research on conspiracy beliefs: Field characteristics, measurement instruments, and associations with personality traits. Frontiers in Psychology, 10.
- Granqvist, P., & Hagekull, B. (2001). Seeking security in the new age: On attachment and emotional compensation. *Journal for the Scientific Study of Religion*, 40, 527–545. https://doi.org/10.1111/0021-8294.00075.
- Imhoff, R., & Bruder, M. (2014). Speaking (un-)truth to power: Conspiracy mentality as a generalised political attitude. *European Journal of Personality*, 28, 25–43.
- Kleppestø, T. H., Czajkowski, N. O., Vassend, O., Røysamb, E., Eftedal, N. H., Sheehy-Skeffington, J., ... Thomsen, L. (2019). Correlations between social dominance orientation and political attitudes reflect common genetic underpinnings. Proceedings of the National Academy of Sciences, 116(36), 17741–17746. https://doi.org/10.1073/pnas.1818711116.
- Kreko, P. (2015). Conspiracy theory as collective motivated cognition. In M. Bilewicz, A. Cichocka, & W. Soral (Eds.), The psychology of conspiracy (pp. 62–75). Routledge.
- Lantian, A., Muller, D., Nurra, C., & Douglas, K. M. (2016). Measuring belief in conspiracy theories: Validation of a French and English single-item scale. *International Review of Social Psychology*, 29(1), 1–14.
- Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86(1), 114. https://doi.org/10.1037/0021-9010.86.1.114.
- Lobato, E., Mendoza, J., Sims, V., & Chin, M. (2014). Examining the relationship between conspiracy theories, paranormal beliefs and pseudoscience acceptance in a university population. *Applied Cognitive Psychology*, 28, 617–625.
- Oliver, J. E., & Wood, T. J. (2014). Conspiracy theories and the paranoid style(s) of mass opinion. *American Journal of Political Science*, 58(4), 952–966.
- Oliver, J. E., & Wood, T. J. (2018). Enchanted America. How intuitition and reason divide our politics. London: University of Chicago Press.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879. https://doi.org/10.1037/0021-9010.88.5.879.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. https://doi.org/10.3758/BRM.40.3.879.
- Raine, A., & Benishay, D. (1995). The SPQ-B: A brief screening instrument for schizotypal personality disorder. *Journal of Personality Disorders*, 9(4), 346–355.
- Rizeq, J., Flora, D. B., & Toplak, M. E. (2020). An examination of the underlying dimensional structure of three domains of contaminated mindware: Paranormal beliefs, conspiracy beliefs, and anti-science attitudes. *Thinking & Reasoning*. https:// doi.org/10.1080/13546783.2020.1759688.
- Sidanius, J., & Pratto, F. (1999). Social dominance: An intergroup theory of social hierarchy and oppression. Cambridge: Cambridge University Press.
- StataCorp. (2019). Stata statistical software: Release 16. College Station, TX: StataCorp LLC.
- Stojanov, A., Stanisavljavic, S., Tatic, V., & Pantic, A. (2019). Conspiracy Thinking Inventory (CTI). Construction and validation study. *Primenjena Psihologija*, 12(4), 363–383.
- Stone, A., McDermott, M. R., Abdi, A., Cornwell, B., Matyas, Z., Reed, R., & Watt, R. (2018). Development and validation of the multi-dimensional questionnaire of scientifically unsubstantiated beliefs. *Personality and Individual Differences*, 128, 146-156
- Swami, V., Barron, D., Weis, L., Voracek, M., Stieger, S., & Furnham, A. (2017). An examination of the factorial and convergent validity of four measures of conspiracist ideation, with recommendations for researchers. *PLoS ONE*, 12(2), Article e0172617. https://doi.org/10.1371/journal.pone.0172617.
- Swami, V., Chamorro-Premuzic, T., & Furnham, A. (2010). Unanswered questions: A preliminary investigation of personality and individual difference predictors of 9/11 conspiracist beliefs. Applied Cognitive Psychology, 24(6), 749–761. https://doi.org/10.1002/acp.1583.
- Swami, V., Coles, R., Stieger, S., Pietschnig, J., Furnham, A., Rehim, S., & Voracek, M. (2011). Conspiracist ideation in Britain and Austria: Evidence of a monological belief system and associations between individual psychological differences and real-world and fictitious conspiracy theories. *British Journal of Psychology*, 102, 443–463. https://doi.org/10.1111/J.2044-8295.2010.02004.X.
- Thorburn Bird, S., & Bogart, L. M. (2003). Birth control conspiracy beliefs, perceived discrimination, and contraception among African Americans: An exploratory study. *Journal of Health Psychology*, 8(2), 263–276. https://doi.org/10.1177/ 1359105303008002669.
- Uscinski, J. E., & Parent, J. M. (2014). American conspiracy theories. Oxford: Oxford University Press.
- Van der Linden, S., Panagopoulos, C., Azevedo, F., & Jost, J. T. (2020). The paranoid style in American politics revisited: An ideological asymmetry in conspiratorial thinking. *Political Psychology*. https://doi.org/10.1111/pops.12681.
- van Prooijen, J.-W. (2018). The psychology of conspiracy theories. London: Routledge. van Prooijen, J.-W., Krouwel, A. P. M., & Pollet, T. V. (2015). Political extremism predicts belief in conspiracy theories. Social Psychological and Personality Science, 6, 570–578.
- Wagner-Egger, P., & Bangerter, A. (2007). La vérité est ailleurs : corrélats de l'adhésion aux théories du complot. Revue internationale de psychologie sociale, 20(4), 31–61.

- Wilson, M. S., & Rose, C. (2014). The role of paranoia in a dual-process motivational model of conspiracy beliefs. In J.-W. Prooijen, & P. A. M. van Lange (Eds.), Power, politics, and paranoia: Why people are suspicious of their leaders (pp. 273–291). Cambridge: Cambridge University Press.
- Cambridge: Cambridge University Press.

 Wood, M. J., & Douglas, K. M. (2018). "Are Conspiracy Theories a Surrogate for God?".

 In A. Dyrendal, D. G. Robertson, & E. Asprem (Eds.), Handbook of Conspiracy Theory and Contemporary Religion (pp. 87-105) Brill.
- Wood, M. J., Douglas, K. M., & Sutton, R. M. (2012). "Dead and Alive: Beliefs in Contradictory Conspiracy Theories.". Social Psychological and Personality Science, 3 (6), 767–773.
- Zakrisson, I. (2005). Construction of a short version of the Right-Wing Authoritarianism (RWA) scale. *Personality and Individual Differences*, *39*, 863–872.