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Applying reactance theory to study consumer responses to COVID restrictions: a note on model specification

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Abstract

Purpose – The purpose of the study is to highlight the relevance of reactance theory for modeling consumer responses to COVID restrictions. The study also aims to critically evaluate the appropriateness of the most established reactance model (the intertwined model) for studying reactance specifically in relation to freedom threats arising from measures aimed at combatting the spread of the pandemic.

Design/methodology/approach – Following a conceptual analysis of the intertwined model of reactance, structural equation modeling is applied to Rain's (2013) meta-analytic data to compare the model to alternative model specifications.

Findings – The analysis reveals both conceptual and statistical shortcomings of the intertwined model of reactance in its current/traditional form. It also draws attention to other model specifications that provide just as good statistical fit and offer promising alternative ways of modeling reactance in a COVID context.

Originality/value – The study is the first attempt to explicitly discuss conceptual and statistical problems associated with the most widely accepted model of reactance, illustrate these issues with specific reference to consumer reactions to COVID restrictions, identify alternative promising model specifications and suggest a respecification of the intertwined model.

Keywords Consumer behavior, Model specification, COVID restrictions, Reactance theory

Paper type Technical paper

Introduction

Since the outbreak of the novel coronavirus disease in 2019 (COVID-19), national governments and health authorities, as well as policy makers of supranational institutions, have introduced measures involving unprecedented restrictions on personal freedoms. In a desperate effort to guide individuals' actions so as to contain the spread of the virus, social and economic norms were disrupted, with citizens being called on to adopt protective behaviors such as social distancing, hygiene practices and self-isolation (e.g. Kleitman *et al.*, 2021). However, the success of such measures ultimately relies on individual behavior change, and evidence suggests that many of the recommended behavioral guidelines are not being followed by enough people to make them optimally effective (Wiest, 2020). In this context, several scholars have investigated the psychological reasons that explain people's

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tendency to (not) comply with COVID transmission mitigation guidelines (Nofal *et al.*, 2020), with some of them referring to the concept of psychological reactance (Kleitman *et al.*, 2021; Sprengholz *et al.*, 2021).

Psychological reactance theory (Brehm, 1966; Brehm and Brehm, 1981) tries to explain and understand human reactions to a freedom threat. In essence, the theory states that when personal freedom is reduced, eliminated or threatened, a person will experience an unpleasant state of arousal (reactance) that triggers attempts to recover or reestablish the lost or threatened behavior. This happens because individuals have a natural predisposition toward preserving and restoring their personal freedoms. A greater threat leads to a greater magnitude of reactance which, in turn, will more strongly prompt the person to reestablish the freedom that has been lost or is being threatened.

In an international marketing context, reactance theory has been used to understand consumers' reactions to cross border acquisitions as a consequence of an ownership change associated with a variation either in the country of brand or the origin of the company (Matarazzo, 2021; Matarazzo *et al.*, 2020, 2022). It has also been used to investigate nationalistic appeals that encourage consumers to shun foreign brands for moral reasons; as Bartikowski *et al.* (2021) show, such appeals may actually increase the reputation of foreign brands, against the intended communication goals. More recently, reactance theory has been used to study consumers' (non) compliance with "buy local" campaigns by government to counteract the negative economic effects of the COVID pandemic (Matarazzo *et al.*, 2022).

What makes reactance theory different from others designed to explain influence attempts is that psychological reactance can be used to understand *failed* practices in persuasive communication – that is, why a message or a campaign was unsuccessful (Rains, 2013; Quick and Considine, 2008; Sly *et al.*, 2001). More generally, reactance theory helps explain why some practices of firms or policy makers may fail, allowing one to learn from *poor* practices that are often more insightful for the investigation of some phenomena than best practices. The context of the COVID pandemic is particularly suitable for linking reactance theory to the field of international marketing because (1) the pandemic has been a global disruptive event, involving people, companies and states worldwide, and (2) this event has fostered nationalistic tendencies as a consequence of escalating export restrictions and limitations to people mobility, with severe impacts on particular sectors such as tourism.

State-of-the-art reactance literature suggests the application of the so-called intertwined model to empirically study the construct of reactance and its effects. Originally proposed by Dillard and Shen (2005), this model conceptualizes reactance as a latent variable reflected in negative cognitions (e.g. counter-arguing) and negative affect (e.g. anger) that arises in response to a freedom threat and which subsequently affects attitudes and (actual/intended) behavior [1]. The model has been repeatedly empirically supported in comparisons with alternative models of reactance (e.g. Kim *et al.*, 2013; Quick, 2012; Rains and Turner, 2007) and, most notably, has been shown to be *the* model of choice in a five-model comparison based on meta-analytic data (Rains, 2013).

However, the intertwined model has largely been tested within the specific domain of persuasive communication, and it is an open question whether it can be equally applied to situations like COVID restrictions where the analysis of freedom-threatening communications needs to go beyond simple messaging, involving such aspects as forced exposure and invasion of privacy. In this context, while a parallel can be drawn between persuasive advertising campaigns by companies and public communication campaigns aimed at controlling the spread and impact of COVID, there is a fundamental difference: in the latter case, the stakes are *much* higher since not only a single company runs a risk, but entire countries or even continents risk compromising their public health systems, their national economies and social stability. Given that COVID restrictions are an integral part of the exit strategy from the pandemic, the fact that they are not accepted by all people is a danger that

should definitely be averted. Understanding *why* messages launched by policy makers to combat COVID often produce effects that are the opposite of what is advocated is the first step to try to limit the damage. Thus, insights into how to best model reactance should help explain and predict its role in the failure of public health messages and campaigns in relation to COVID, eventually resulting in improved communication effectiveness and greater compliance.

Against this background, in this paper, we address the following research question*: is the intertwined model the best model for accurately characterizing reactance in response to COVID restrictions?*

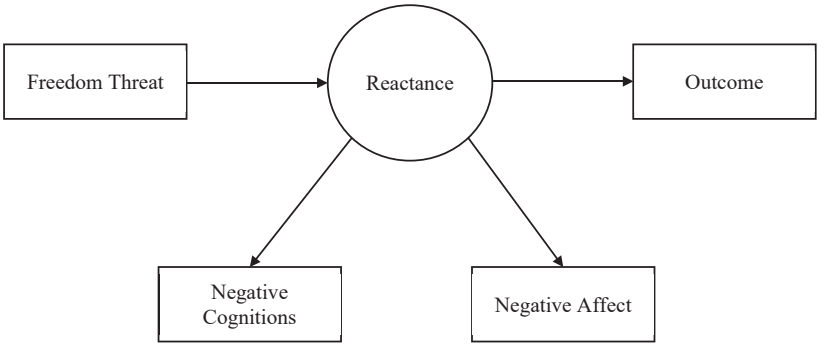
To answer this question, we revisit the intertwined model – which seems to have attained status of "conventional wisdom" in reactance research – and highlight some conceptual and statistical issues that raise doubts regarding its overall soundness. We begin by critically discussing the key premises of the model, highlighting issues particularly relevant to its application in the context of COVID-related restrictions and mandatory policies. Next, we reanalyze Rains' (2013) empirical data and show that – while we can replicate his results demonstrating very good fit of the intertwined model – there are alternative model structures that provide equally good fit and which are formally indistinguishable from the intertwined model. Overall, our analysis shows that the intertwined model is not necessarily the "best" or "only" option available to researchers wishing to apply reactance theory in a COVID context and that there are other model specifications that are worthy of consideration. By alerting researchers to these alternative possibilities, we respond to recent research calls regarding "how to best characterize the intervening psychological response [i.e. reactance]" (Ratcliff, 2021, pp. 1052-1053) linking a freedom threat to subsequent attitudinal and behavioral responses. While our contribution is primarily methodological, our analysis also has implications for policy makers, since an effective specification of the reactance model helps provide guidance for the identification of appropriate strategies for minimizing reactance and thus increase message effectiveness and subsequent compliance.

Modeling reactance in the context of COVID: the intertwined model

There is consensus in contemporary reactance research that reactance should be characterized as "a process consisting of three components: a threat to freedom (antecedent), an attempt to reinforce freedom (outcome), and an intervening psychological response (Brehm, 1966; Brehm and Brehm, 1981) . . . There is strong theoretical and empirical support for capturing a mediating psychological variable (Brehm and Brehm, 1981) and for characterizing it as anger and negative cognitions (Dillard and Shen, 2005; Rains, 2013)" (Ratcliff, 2021, p. 1047). As can be seen from Figure 1, the intertwined model of reactance is fully consistent with these premises.

Conceptual issues

A closer look at the structure of the intertwined model, however, reveals a number of issues of potential concern. First, in contrast to alternative specifications – such as the dual process model (Dillard and Shen, 2005) in which (negative) cognitions and affect are specified as parallel mediators between freedom threat and outcome variables (see Figure A1) – it is not possible to determine whether cognitions and affect have similar or different impacts on outcome variables. However, this might be of theoretical and practical importance, not least because "whether people react more emotionally or cognitively to freedom threats depends on the context, what is being communicated, and the individual" (Ratcliff, 2021, p. 1048). In the specific case of COVID restrictions, the need to identify precisely the intervening psychological response is inconsistent with a model that defines reactance as an



Note(s): In Rains' (2013) meta-analytic study, negative cognitions are represented by counterarguments, negative affect by anger, and the outcome by attitudes

Figure 1.
The intertwined model of reactance

"amalgam" of negative cognitions and affect (Rains, 2013). Indeed, (negative) cognition is conceptually different from (negative) affect, and, as argued below, keeping them separate may help to better understand people's responses to COVID restrictions.

Second, and related to the previous point, the intertwined model does not offer any insight as to whether the perception of a specific freedom threat is likely to primarily result in negative emotions (such as irritation or anger), rather than negative thoughts (such as disagreement with the message or derogation of the source). Again, this might be of relevance in a persuasive communications context. Knowing whether a threat to freedom generated by a particular message is more likely to have a stronger (weaker) impact on affect than cognition within the target group is clearly helpful for message design and execution purposes. This is particularly true in the context of COVID and well-illustrated by considering the controversial issue of making vaccination mandatory. Many governments launched campaigns aiming to encourage vaccination by introducing the Green Pass, a certificate confirming that the holder has been vaccinated, tested negative or recovered from COVID. Moreover, several countries introduced mandatory vaccination policies either across the board (i.e. for all citizens, such as in Austria), for particular age groups (e.g. 60+, such as in Greece) or for specific occupational categories (e.g. health care workers, such as in Italy). There is little doubt that such policies are viewed by many citizens as constituting a serious freedom threat as evidenced by the "No Vax" and "No Green Pass" movements and the large number of people (repeatedly) taking to the streets across Europe to demonstrate against such policies. Indeed, information about hypothetical mandatory vaccination policies has been shown to elicit reactance, particularly when vaccination intentions and support for mandatory policies are low (Betsch and Böhm, 2016; Sprengholz and Betsch, 2020).

While a freedom threat can be expected to trigger reactance, the nature of the latter need not be uniform for all individuals, in that for some it may be primarily manifested in negative cognitions and for others in negative affect; moreover, the corresponding impact on attitudinal and behavioral outcomes may be different. For example, counterarguing seems to characterize more the "No Vax" position that comprises people who do not want to hear about vaccines, refuse them and probably will never get vaccinated even if it is/becomes mandatory. Typical examples of counterarguing include:

(1) *Health dictatorship regime:* the establishment hides the truth about the negative effects of vaccines; they were not properly tested because there was no time.

(2) *Ineffectiveness of vaccines:* they are unable to protect against all variants of the virus.

(3) *Big pharma conspiracies:* the pharmaceutical companies are responsible for the spread of the pandemic as the vaccines are profitable for them; COVID is an invention.

(4) *Bill Gates conspiracies:* he created the pandemic to inject micro-chips through the vaccine and get the full control of people via 5G.

Importantly, a recent study in Italy (Corti *et al.*, 2021) showed that the so-called vaccine hesitancy is very different from the "No Vax" movement as it includes people who try to delay the vaccination (but may eventually do it). This hesitancy seems to be fostered by preoccupation, fear, anxiety, anger, irritation and frustration due to a lack of trust in science and public authorities and a strong desire to exercise the right of choice which should not be denied in liberal civilizations and democratic societies (Figure 2).

The distinction of the manifestation of reactance in terms of cognitions vs. affect is thus of considerable importance because it may allow policy makers to distinguish between two different groups of people: the "No Vax" who are more difficult to convince, and the "Hesitant Vax"; the latter group is potentially easier to convince in getting the vaccination, since it seems not to have radical beliefs and is driven more by negative affect. Consequently, communication techniques may need to be adapted for the two groups, because clear, controlled and accurate information aligned among all relevant public authorities may be more important for the "No Vax" than for the "Hesitant Vax" group. For the former group, close monitoring of social media to contain in advance fake news may be crucial (a sort of "vaccination against disinformation") before it becomes so widespread and thus impossible to manage. In contrast, for the "Hesitant Vax" group, a communication campaign more focused on narratives, aiming at calming individual fears and offering reassurance, may be more effective.

Third, and perhaps most important, the structure of the intertwined model is *not* unambiguous as it is consistent with alternative theoretical interpretations. Following Rains (2013), the standard/common interpretation of Figure 1 is that an observed variable (freedom threat) impacts a latent variable (reactance) measured with two reflective indicators (negative cognitions and negative affect), which, in turn, impacts another observed variable (attitude or behavior). However, there is another interpretation of Figure 1 that arises because the outcome variable (attitude/behavior) can be conceived both as a *consequence* of reactance and as a *measure/indicator* of reactance. In the latter case, the interpretation of Figure 1 would be that an observed variable (freedom threat) impacts a latent variable measured by *three*

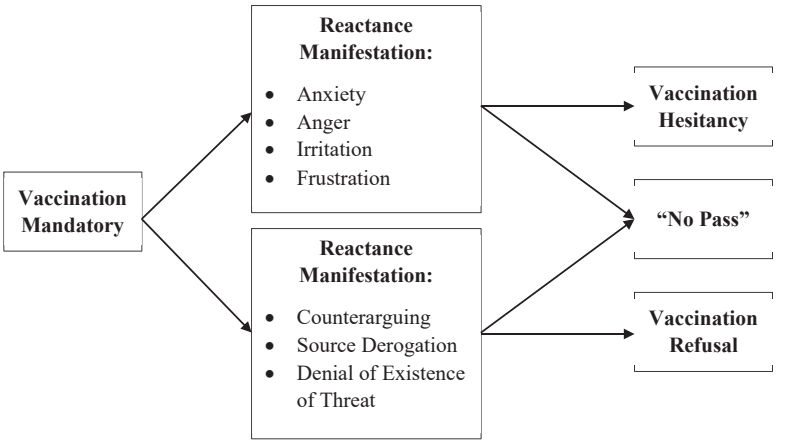


Figure 2.
Reactance theory in the context of COVID vaccination

observable indicators [2]. Both interpretations are fully consistent with the intertwined model, and there is no way that they can be empirically distinguished.

Statistical issues

The strongest empirical support for the intertwined model is offered by the comprehensive meta-analytic study of Rains (2013) in which it was compared against four other models (see Figure A1). Three of these – the single process cognitive model, the single process affective model and the dual process cognitive-affective model – were drawn from Dillard and Shen (2005), while the fourth (the linear affective cognitive model) from Rains and Turner (2007). Using structural equation modeling with LISREL 8.8 (Joreskog and Sorbom, 2007) and relying on the comparative fit index (CFI) and standardized root mean square residual (SRMR) for fit evaluation as well as on the Akaike information criterion (AIC) and Bayesian information criterion (BIC) for (non-nested) model comparison purposes, Rains (2013, p. 61) concluded that "[t]aken together, the model fit indices provide consistent evidence that the intertwined model of reactance best fits the sample data."

While a reanalysis of Rains' (2013) data with LISREL 11.0 (Jöreskog and Sörbom, 2021), using the meta-analytic correlation matrix as input, confirmed that the intertwined model outperforms the alternative models shown in Figure A1, it also revealed several issues worthy of attention. First, and against the impression gained from Rains' (2013) presentation of the path estimates of the intertwined model, not all parameters were actually *estimated*. This is because the latent variable (reactance) had its variance fixed to 1 (i.e. it was standardized), as a result of which the path from reactance to anger (representing negative affect) was "automatically" fixed to a certain value [3].

Second, the LISREL output corresponds to the second interpretation of Figure 1 discussed earlier as it contains a *single* structural relation (linking freedom threat to reactance) and *three* measurement equations, linking reactance to anger, counterarguments *and* attitude (i.e. the outcome variable). This underscores the point made in the previous section that the model structure of the intertwined model is not conceptually unambiguous.

Third, for some reason, Rains (2013) failed to consider two rather "obvious" alternative models and compare their fit to that of the intertwined model. Both these models represent variations of the dual process model in Figure A1, incorporating an additional path either from cognition to affect or from affect to cognition (see Figure 3). Note that these models are *equivalent*, that is, they provide identical fit to sample data (Hershberger, 2006) [4]. This model fit – obtained after estimating the models in Figure 3 on Rains' (2013) data – is excellent as indicated by a chi-square value very close to zero ($\chi^2 = 0.000274$, DF = 1, $p = 0.987$). In fact, the fit is so good that LISREL does not even report any other fit indices, declaring instead that "the fit is perfect!"

In short, there *are* other model specifications that provide equally (or even more) impressive fit to empirical data as the intertwined model. In this context, an advantage of the two models shown in Figure 3 is that they enable the estimation and comparison of different (indirect) pathways linking freedom threat and the outcome variable of interest. For example, Model A reveals three such routes: through cognitions only, through affect only and through both cognition and affect. This "effect decomposition" offers more fine-grained insights into how a freedom threat may impact consumer attitudes or behavior than is the case with the intertwined model.

Fourth, in undertaking model comparisons between the intertwined model and the four models in Figure A1, Rains (2013) relied on the BIC and AIC which, while acceptable at the time, are no longer considered state-of-the-art criteria for comparing non-nested models (e.g. see Preacher and Merkle, 2012). Contemporary non-nested comparisons follow the procedures outlined by Merkle *et al.* (2016) involving an initial test of distinguishability

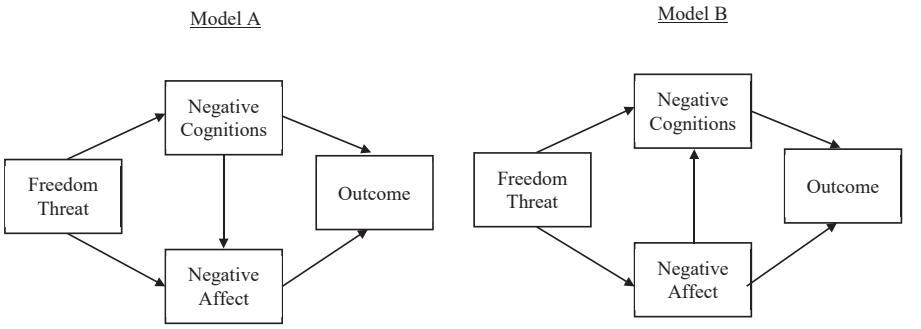


Figure 3.
Alternative models of reactance

(i.e. that the models can be differentiated in the population of interest) and followed by a non-nested likelihood ratio test (LRT) to formally compare the models [5]. We applied this procedure to contrast the intertwined model in Figure 1 with Model A in Figure 3 [6]. The results revealed that we cannot reject the null hypothesis that the two models can be distinguished ($\omega^2 = 0.004$, $p = 0.437$), making any further comparison redundant [7]. This analysis provides further evidence that the intertwined model is not the *only* model that is highly consistent with empirical data.

Concluding remarks

There is a little doubt that the COVID crisis created exceptional conditions for applying reactance theory, as reactance is always elicited whenever a freedom is restricted or threatened (Brehm, 1966). In fact, the numerous restrictions of daily life which accompanied the COVID pandemic – ranging from leaving one's home to going on holiday – led to a worldwide experience of reactance. The latter, in turn, fueled tendencies to adopt fewer protective health behaviors such as wearing masks, avoiding close personal contact and not participating in social events as well as decreased willingness to receive other, nonmandatory vaccinations, such as a flu shot (Sprengholz *et al.*, 2021). Due to the omnipresence of reactance, it is thus not surprising that the construct has been applied to study responses to behavioral restrictions brought about by the COVID pandemic (e.g. Sprengholz *et al.*, 2021; Dimoff *et al.*, 2021; Clarke *et al.*, 2021).

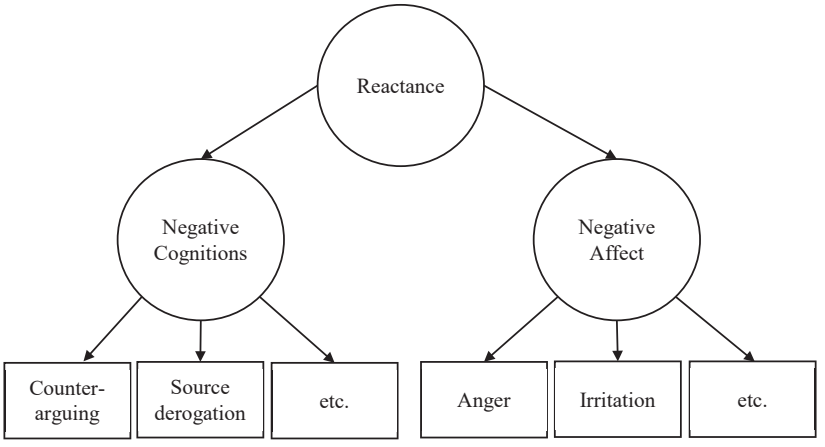
In light of the wide acceptance of the intertwined model within the persuasive communications literature (Ratcliff, 2021), it may be tempting to "pick it off the shelf" and conceptualize reactance accordingly, that is, "as an amalgam of anger and counterarguments in response to a freedom threat" (Rains, 2013, p. 69) or, more generally, as a latent variable with negative cognitions and negative affect as indicators. However, as was shown above, the intertwined model raises a number of concerns that question its current status as *the* model for conceptualizing reactance. These concerns – both conceptual and statistical – inevitably raise the issue of *how* should reactance be best modeled, especially in the context of COVID.

We see at least two alternatives worth considering. The first and perhaps most simple alternative is the use of one of the two models in Figure 3, both of which fit empirical data at least as well as the intertwined model. While, as already noted, the models are – statistically speaking – equivalent, they differ in their structures and are associated with different theoretical perspectives. Model A is consistent with cognitive appraisal theory, whereby cognitions precede affect in that "underlying evaluations of a situation (e.g. its desirability, certainty, etc.) combine to elicit specific emotions" (Watson and Spence, 2007, p. 488). Model B, on the other hand, is consistent with the "primacy of affect" thesis in which emotional

responses precede cognitive evaluations (Zajonc, 1980, 1984). Choosing between Model A and Model B obviously has to be based on the specific research context and the theoretical lens that fits that context best. For example, Model A may be more appropriate for understanding the underling motivations of "No Vax" individuals whose negative cognitions on vaccinations lead to anger and, subsequently, to protests in the streets. On the other hand, Model B may be better for explaining the "Hesitant Vax" group due mainly to people's preoccupation and anxiety (negative affect) regarding the possible effects (and side-effects) of vaccination.

The second modeling alternative is to retain the basic idea of the intertwined model but respecify the latter in a way that overcomes some of its previously noted deficiencies. Such respecification could involve approaching reactance as a second-order construct with two first-order dimensions, capturing negative cognitions and negative affect, respectively; in turn, each of the two dimensions would be measured by several, directly observable indicators [8]. Such a model specification is graphically shown in Figure 4 and enables reactance to be linked to other constructs while explicitly acknowledging its dimensionality. A further advantage of modeling reactance along the lines of Figure 4 (i.e. as a higher-order construct) is that it is possible to formally assess its fit to empirical data. In contrast, a measurement model of reactance as a first-order construct with just two indicators (i.e. negative cognitions and affect) as proposed by Dillard and Shen (2005) and later by Rains (2013) is not on its own (i.e. independently) identified and cannot be estimated, let alone tested [9]. We thus urge researchers wishing to model reactance as a response to COVID restrictions, to carefully consider these alternative options and not "blindly" opt for the intertwined model in their research endeavors.

Finally, in addition to contributing to the theoretical modeling of reactance, our analysis also has implications for policy makers, since "correct" specification of the reactance model should help explain and predict the role of reactance in the context of failure of preventative messages and health campaigns in relation to COVID. By recognizing that well-intentioned measures to contain COVID may be perceived as freedom threats that trigger reactance manifested in both cognitive and affective dimensions, policy makers can hopefully take appropriate steps (e.g. through careful use of language when framing messages) to minimize reactance and encourage compliance (Xu, 2019).



Note(s): Indicators for Negative Cognitions/Affect are for illustration purposes only

Figure 4.
Respecification of the intertwined model of reactance

Notes

1. According to Dillard and Shen (2005, p. 149), the intertwined model suggests that "affect and cognition are so closely interwoven that they are better thought of as indicators of an underlying concept than as distinct phenomena."
2. Formally, this interpretation corresponds to that of a MIMIC model (Jöreskog and Goldberger, 1975).
3. If no indicator scaling is used by fixing the loading of an indicator on the latent variable to 1, LISREL standardizes the latent variable by default. Note that the correlation between two indicators is equal to the product of their (standardized) loadings. Since a correlation (rather than a covariance) matrix is used as input and since the coefficient from reactance to counterarguments (representing negative cognitions) was estimated to be 0.52, the path from reactance to anger had to be fixed to 0.62 so that their product equals 0.31, which is the correlation (within rounding error) between anger and counterarguments (see Figure in Rains, 2013).
4. As MacCallum *et al.* (1993, p. 185) point out, "for any given model, there will generally be alternative models, represented by different patterns of relations among the variables, that are indistinguishable in terms of goodness of fit to sample data . . . such models can be distinguished as interpretability of parameter estimates and meaningfulness of the model."
5. As Merkle *et al.* (2016, pp. 5-6) emphasize, "it is important to test for distinguishability when doing model comparisons: if the observed data imply that the models are indistinguishable in the population of interest, then there is no point in further model comparison . . . Assuming that the models are distinguishable, we can compare the models' fits and potentially select one as better."
6. The authors would like to thank Peter Gidakovic at the University of Ljubljana for performing these comparisons.
7. For completeness and illustration purposes, we also applied the non-nested LRT to test the following hypotheses:
   H_0: Model fits are equal for the focal population.
   H_{1A}: The intertwined model fits better than Model A ($z = 0.532$, $p = 0.703$)
   H_{1B}: Model A fits better than the intertwined model ($z = 0.532$, $p = 0.297$)
   The analysis was conducted with the R package *nonnest2* (Merkle and You, 2014). Given that, as already noted, Model A and Model B are equivalent, the same results also apply to the comparison of Model B with the intertwined model.
8. For methodological discussions of higher-order constructs, see Law *et al.* (1998), Wong *et al.* (2008) and Polites *et al.* (2012).
9. With two indicators, there are three elements in the sample covariance matrix (two variances and one covariance). However, assuming standardization of the latent variable (i.e. setting its variance to 1), there are two loadings and two error variances that need to be estimated. Thus, the degrees of freedom are negative and the model is under-identified.

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Appendix

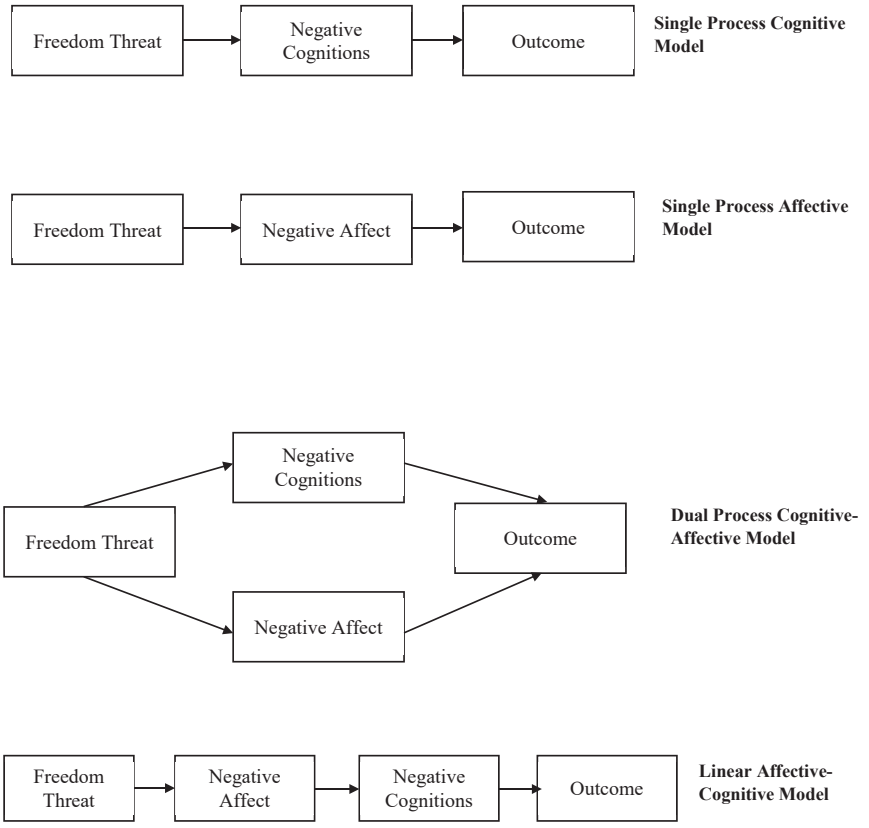

Figure A1. Alternative models of reactance

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