Supplemental Materials

Table A. Missing Data Analysis of Scale Completion for Imputation Procedures (N = 730).

Variables	Valid data (N)	Missed the whole scale N (%)	Missing values	MCAR[1] (Little's test p > .05)	MAR[2] (Visual inspection)	MNAR[3] (Visual inspection)	Method of Imputation[4]
PBI – Mother	727	3 (0.41%)	0.25%	No	Yes	No	MI
PBI – Father	690	40 (5.47%)	0.16%	No	Yes	No	MI
Attachment	717	12 (1.64%)	0.21%	No	Yes	No	MI
Depression	724	6 (0.82%)	0.55%	No	Yes	No	MI
Suicidal Ideation	728	2 (0.27%)	0.12%	Yes	No	No	EM
Defeat	699	31 (4.24%)	0.19%	Yes	No	No	EM
Entrapment	700	30 (4.10%)	0.23%	No	Yes	No	MI
Coping	680	50 (6.84%)	0.24%	No	Yes	No	MI
Resilience	716	14 (1.91%)	0.07%	Yes	No	No	EM

[1]MCAR = Missing Completely at Random.
[2]MAR = Missing at Random.
3MNAR = Missing not at Random.
[4]MI = Multiple Imputation. EM = Expectation-Maximization.

Factor Analysis of the Brief COPE Inventory

The Brief COPE Inventory (BCI) (Carver, 1997) is a 28-item self-report questionnaire that assesses 14 adaptive and maladaptive coping skills: Self-distraction[1] (ω = 0.396 , SE = 0.05 , CI = 0.294 to 0.483), Active coping (ω = 0.748, SE = 0.048, CI = 0.653 to 0.843), Denial (ω = 0.659, SE = 0.080, CI = 0.502 to 0.817), Substance use (ω = 0.925, SE = 0.011, CI = 0.901 to 0.948), Use of emotional support (ω = 0.804, SE = 0.017, CI = 0.770 to 0.839), Use of instrumental support (ω = 0.854, SE = 0.013, CI = 0.827 to 0.881); Behavioural disengagement (ω = 0.728, SE = 0.032, CI = 0.664 to 0.793), Venting (ω = 0.588, SE = 0.033, CI = 0.522 to 0.654), Positive reframing (ω = 0.754, SE = 0.022, CI = 0.709 to 0.799), Planning (ω = 0.780, SE = 0.019, CI = 0.742 to 0.818), Humour (ω = 0.858, SE = 0.0124, CI = 0.834 to 0.883), Acceptance (ω = 0.661, SE = 0.030, CI = 0.602 to 0.720), Religion (ω = 0.836, SE = 0.028, CI = 0.780 to 0.892), Self-blame (ω = 0.769, SE = 0.020, CI = 0.729 to 0.809). Each of the subscales is comprised of two items through a 4-point Likert-type scale ranging from 1 ('I've not done this at all') to 4 ('I've been doing this a lot') (N = 680). This measure has been used in suicide and self-harm research (e.g., Horgan and Martin, 2016; Poindexter et al., 2015).

In order to test H4, we conducted an exploratory factor analysis (EFA) of the Brief COPE Inventory (BCI; Carver, 1997). The dataset was split into two subsamples, exploratory and confirmatory, to conduct an EFA with the former and a confirmatory factor analysis (CFA) to test the fit of the EFA solution in the latter subsample. Considering that the original structure of the BCI proposes two items per subscale – which is not recommended as this may affect the psychometric properties of the instrument, consequently leading to potential bias (Raubenheimer, 2004) –, it was wiser to conduct these series of analyses (EFA–CFA–Internal consistency). Tests for comparing differences between the subsamples were conducted. Chi-square tests showed no significant

[1] Omega values relate to the internal consistencies associated with each scale in the present study.

differences for categorical demographic variables between subsamples (Table B, Supplemental Materials). The *t*-tests also revealed no differences between exploratory and confirmatory subsamples on age and item response (Table C, Supplemental Materials). The suitability for exploratory factor analysis (EFA) was assessed prior to the analysis through the exploratory subsample. The overall Kaiser-Meyer-Olkin (KMO) measure was 0.823 with individual KMO measures all greater than 0.7, classifications of 'middling' to 'meritorious' according to Kaiser (1974). Bartlett's Test of Sphericity was statistically significant ($p < .0001$), indicating that the data was likely factorisable. Parallel Analysis (Monte Carlo Simulation) suggested the retention of five factors (Cattell, 1966; Figure A: Supplemental material). A three-factor solution met the interpretability criterion and, as such, three factors were retained. The decision of the number of factors to be retained was mainly influenced by the criterion of minimum three items per factor.

The three-factor solution explained 33.2% of the total variance. We used oblique rotation (oblimin) once research on coping behaviour indicates that the scales are correlated (Carver, Scheier, & Weintraub, 1989; Ingledew, Hardy, Cooper, & Jemal, 1996; Lyne & Roger, 2000), as suggested by O'Connor & O'Connor (2003). The rotated solution exhibited 'simple structure' (Thurstone, 1947). The new factors were labelled *Problem-Focused Coping* ($\omega = 86$), *Social support seeking* ($\omega = 88$), and *Maladaptive coping* ($\omega = 77$). The BCI subscale factor loadings of the rotated solution are presented in Table D (Supplemental Material). We subsequently conducted a CFA in the confirmatory subsample to test the solution generated by the EFA. The three-factor EFA model was tested with through R version 3.5.1 using LAVAAN package for R (Rosseel, 2012) and showed very good/excellent fit: CMIN/DF = 2.2172, CFI = .993, GFI = .993, AGFI = .990, SRMR = .072, RMSEA = .060, PCLOSE = .039. Analysis of internal consistency was also conducted in the confirmatory subsample and delivered good indices (Table E, Supplemental Materials).

Table B. Demographic differences between exploratory and confirmatory subsamples.

	Pearson's X^2	*df*	*p*	*Cramer's v*
Gender	.061	1	.805	.010
Ethnicity	3.860	3	.277	.076
Marital Status	3.252	6	.777	.069
Sexual Orientation	2.676	3	.444	.063

Note: Analysis conducted with subsample 1.

Table C. Mean differences between exploratory and confirmatory subsamples for age and item response.

	t	*df*	*p*	*Mean Difference*	*Std. Error Difference*	*Cohen's d*	*95%C.I*
Age	0.323	677	0.747	0.211	0.654	0.02	-1.072, 1.495
Item 1	0.301	678	0.763	0.024	0.078	0.02	-0.13, 0.177
Item 2	0.039	678	0.969	0.003	0.075	0.00	-0.144, 0.15
Item 3	-0.88	678	0.379	-0.047	0.053	-0.07	-0.152, 0.058
Item 4	-1.093	678	0.275	-0.068	0.062	-0.08	-0.189, 0.054
Item 5	-0.381	678	0.703	-0.029	0.077	-0.03	-0.181, 0.122
Item 6	-1.782	678	0.075	-0.115	0.064	-0.14	-0.241, 0.012
Item 7	1.906	678	0.057	0.141	0.074	0.15	-0.004, 0.287
Item 8	0.058	678	0.954	0.003	0.051	0.00	-0.097, 0.103
Item 9	1.261	678	0.208	0.082	0.065	0.10	-0.046, 0.211
Item 10	0.831	678	0.406	0.065	0.078	0.06	-0.088, 0.218
Item 11	-1.231	678	0.219	-0.074	0.060	-0.09	-0.191, 0.044
Item 12	0.813	678	0.417	0.062	0.076	0.06	-0.087, 0.211
Item 13	-2.088	678	0.037	-0.168	0.080	-0.16	-0.325, -0.01
Item 14	-0.402	678	0.688	-0.029	0.073	-0.03	-0.173, 0.114
Item 15	1.08	678	0.280	0.085	0.079	0.08	-0.07, 0.24
Item 16	-1.675	678	0.094	-0.091	0.054	-0.13	-0.198, 0.016
Item 17	0.564	678	0.573	0.041	0.073	0.04	-0.102, 0.185
Item 18	1.172	678	0.242	0.094	0.080	0.09	-0.064, 0.252
Item 19	-0.845	678	0.399	-0.068	0.080	-0.06	-0.225, 0.09
Item 20	0.764	678	0.445	0.059	0.077	0.06	-0.092, 0.21
Item 21	-0.948	678	0.343	-0.071	0.074	-0.07	-0.217, 0.076
Item 22	0.972	678	0.332	0.065	0.067	0.07	-0.066, 0.195
Item 23	-0.038	678	0.970	-0.003	0.078	0.00	-0.156, 0.15
Item 24	-0.081	678	0.935	-0.006	0.072	-0.01	-0.148, 0.136
Item 25	-0.536	678	0.592	-0.041	0.077	-0.04	-0.192, 0.11
Item 26	-1.487	678	0.138	-0.124	0.083	-0.11	-0.287, 0.04
Item 27	0.478	678	0.633	0.032	0.068	0.04	-0.101, 0.165
Item 28	0.699	678	0.485	0.053	0.076	0.05	-0.096, 0.202

Table D. Factor loadings of the Brief COPE Inventory exploratory factor analysis.

Item		Factor						Uniqueness
		1	2	3	4	5	6	
2	I've been concentrating my efforts on doing something about the situation I'm in.	**0.701**	0.015	-0.119	0.025	-0.074	-0.052	0.543
7	I've been taking action to try to make the situation better.	**0.678**	0.103	-0.041	-0.019	-0.007	-0.012	0.457
12	I've been trying to see it in a different light, to make it seem more positive.	**0.582**	0.021	-0.018	0.08	0.105	0.083	0.551
14	I've been trying to come up with a strategy about what to do.	**0.732**	0.109	0.045	-0.062	0.001	-0.029	0.361
17	I've been looking for something good in what is happening.	**0.530**	0.047	-0.035	0.019	0.258	0.077	0.471
24	I've been learning to live with it.	**0.451**	-0.011	0.04	-0.004	0.201	0.062	0.663
25	I've been thinking hard about what steps to take.	**0.651**	0.067	0.057	-0.079	0.057	0.072	0.432
5	I've been getting emotional support from others.	0.028	**0.795**	-0.103	0.108	-0.067	-0.012	0.354
10	I've been getting help and advice from other people.	-0.012	**0.857**	-0.003	-0.016	-0.009	-0.008	0.284
15	I've been getting comfort and understanding from someone.	0.035	**0.786**	0.006	-0.035	0.052	0.034	0.311
21	I've been expressing my negative feelings.	0.039	**0.403**	0.294	0.027	0.138	0.081	0.638
23	I've been trying to get advice or help from other people about what to do.	0.097	**0.733**	0.091	-0.054	-0.007	0.033	0.358
3	I've been saying to myself "this isn't real".	0.243	-0.162	**0.473**	0.103	-0.141	0.075	0.687
6	I've been giving up trying to deal with it.	-0.207	0.023	**0.695**	0.043	-0.072	0.006	0.452
8	I've been refusing to believe that it has happened.	0.169	-0.181	**0.482**	0.061	-0.169	0.138	0.684
13	I've been criticizing myself.	0.075	0.023	**0.648**	-0.027	0.111	-0.114	0.558
16	I've been giving up the attempt to cope.	-0.157	0.039	**0.649**	0.104	0.006	0.004	0.501
26	I've been blaming myself for things that happened.	0.057	-0.013	**0.684**	-0.005	0.06	-0.072	0.523
4	I've been using alcohol or other drugs to make myself feel better.	0.009	-0.007	-0.023	**0.993**	-0.001	-0.009	0.031
11	I've been using alcohol or other drugs to help me get through it.	-0.028	0.02	0.05	**0.854**	0.02	-0.009	0.228
18	I've been making jokes about it.	0.035	0.005	-0.031	0.006	**0.846**	-0.02	0.265
28	I've been making fun of the situation.	-0.004	-0.029	0.04	0.025	**0.765**	0.034	0.408
22	I've been trying to find comfort in my religion or spiritual beliefs.	-0.052	0.006	-0.022	-0.017	0.05	**0.917**	0.168

27	I've been praying or meditating.	0.071	0.019	-0.02	-0.007	-0.089	**0.754**	0.409
1	I've been turning to work or other activities to take my mind off things.	0.303	-0.114	0.13	0.018	0.00	0.077	0.897
19	I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	0.038	0.272	0.237	0.042	0.13	-0.006	0.804
20	I've been accepting the reality of the fact that it has happened.	0.258	0.061	0.014	0.072	0.327	0.123	0.67
9	I've been saying things to let my unpleasant feelings escape.	0.144	0.115	0.392	0.121	0.104	0.188	0.636

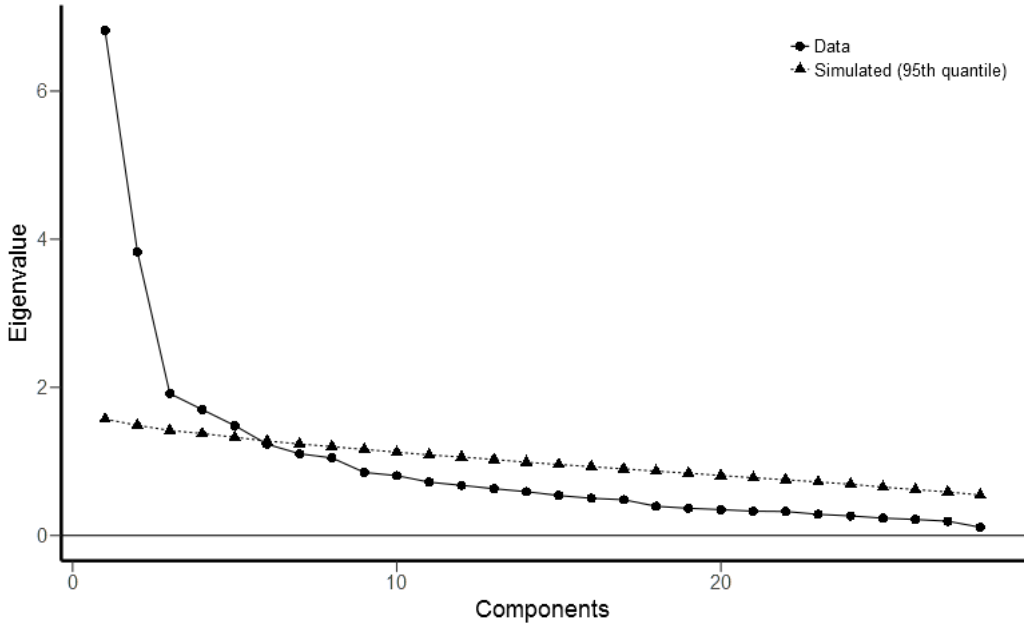
Note: Oblimin rotation was employed. Boldfaced values represent the items that predominate each factor. **Problem-focused coping:** items 2, 7, 12, 14, 17, 24, 25. **Social support seeking:** items 5, 10, 15, 21, 23. **Maladaptive coping:** 3, 6, 8, 13, 16, 26.

Table E. Validity and reliability indices for the Brief COPE Inventory EFA solution.

Factors	α	*Omega Indices*			*HTMT*
		ω	*S.E.*	*95%C.I.*	
Problem-focused coping (P)	.866	.867	.012	.843 – .832	*htmt*(*P*,*S*) = .661 *htmt*(*P*,*M*) = .181 *htmt*(*S*,*M*) = .200
Social support seeking (S)	.881	.887	.010	.867 – .907	
Maladaptive coping (M)	.749	.773	.018	.737 – .808	

Note: Values generated from the confirmatory subsample.

Figure A. Scree plot of the exploratory subsample with Monte Carlo simulated cut-off for factor retention.



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Supplementary Material

Alternative Post-hoc Analysis

During the review of the current paper, it was suggested by one of the reviewers that a single model including all of the study's variables (Panel 1, Figure A) should be considered for analysis as a way to test the IMV model of suicidal behaviour in its entirety (O'Connor & Kirtley, 2018). Although testing the IMV model was not a primary aim of our study, rather it acts as a theoretical platform to understand the relationship between past perceptions of parenting, current attachment dimensions, and suicide risk, we conducted some additional exploratory analyses. A set of alternative post-hoc analytical procedures were conducted, partially combining the models specified in hypotheses 2-5 in the main text (represented in Figure 2, panels A-D). Figure A presented below represents the analytical stages to compose the final post-hoc models to be tested.

Although the reviewer's request involves testing a combined model of all study variables, we have not found a version of Structural Equation Modelling (statistical technique suggested by the reviewer) available that would allow us to test Panel 1 as a single model at once, mainly due to the difficulty of including multiple moderators in a serial and parallel multi-mediation path analysis[1]. Therefore, in order to get as close as possible to the reviewer's request, the variables coping and resilience were excluded from the path analysis model (Panel 2) and tested separately as moderation models (Panel 3). Further considerations and methodological challenges are discussed at the end of this supplementary document.

[1] *Serial multi-mediation models* involve the direct and indirect effects of a predictor X on an outcome Y while modelling a process with multiple intermediate mediators M in which X causes M1, which in turn causes M2, and so forth, concluding with Y as the final predicted variable (Hayes, 2018; see Littlewood et al. (2016) for an empirical example). *Parallel multi-mediation models* are those that test multiple mediators at the same time in a parallel format. The model establishes an antecedent variable X that is modelled as influencing the outcome variable Y directly as well as indirectly via two or more mediators, with the condition that no mediator causally influences another (Hayes, 2018; see Ding, Ng, & Li (2014) for an empirical example). Panel A of Figure 2 is an example of parallel multi-mediation model in which attachment dimensions are tested as parallel mediators.

Therefore, the following post-hoc analyses (PA) were conducted:

PA1: Perceptions of past parenting are associated with suicidal ideation through the indirect path that includes attachment dimensions, defeat, and entrapment, respectively, adjusting for depressive symptoms (Panel 2, Figure A).

PA2: Coping moderates the relationship between defeat and entrapment, adjusting for depressive symptoms (Moderation 1, Panel 3, Figure A).

PA3: Resilience moderates the relationship between entrapment and suicidal ideation, adjusting for depressive symptoms (Moderation 2, Panel 3, Figure A).

Statistical Analysis

To test PA1-PA3, two different statistical procedures were employed: path analysis through Structural Equation Modeling (SEM) for PA1 (Panel 2, Figure A), and moderation analysis for PA2 and PA3 (Panel 3, Figure A). A full SEM including confirmatory factor analysis (CFA) of latent variables was not conducted, since the study variables were originally planned to be assessed via psychometrically established scales designed to measure the latent constructs of interest (e.g., defeat, entrapment, attachment dimensions, etc.). The statistical analyses were conducted in R version 3.5.3. SEM was run through the package *lavaan* (Rosseel, 2012), version 0.6.3, and the moderation models were conducted with the *Fitting Linear Models* function of the *R stats* package. To conduct SEM, we have used the *robust* maximum likelihood method of estimation that is less affected by the deleterious effects of non-normality, considering the skewed nature of the distribution of suicidal ideation when assessed in general populations, which is the case of our sample.

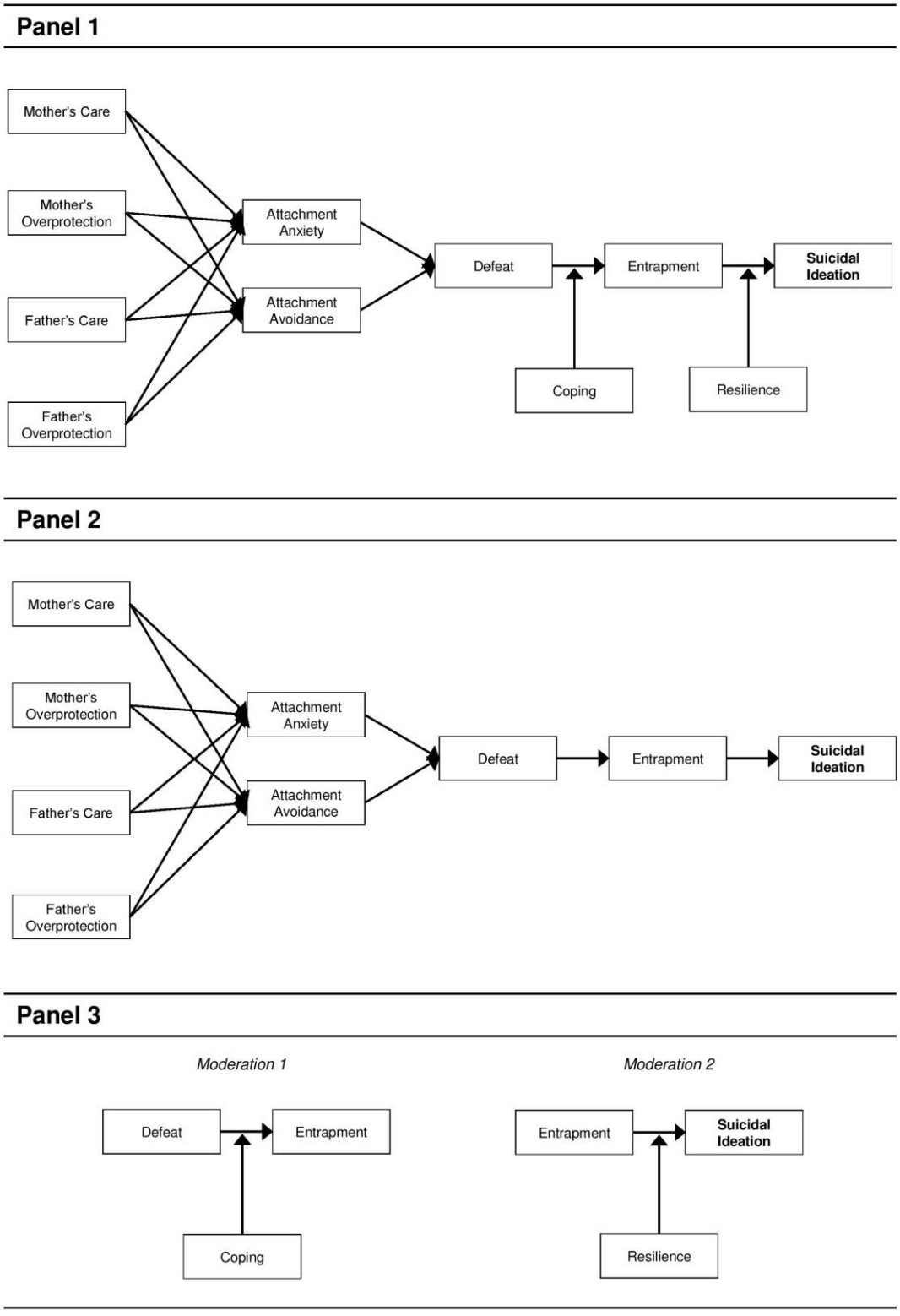

Figure A. Representation of the analytical stages of the combined model. *Panel 1*: Complete combined model, including all variables tested in the paper. *Panel 2*: Combined model including only mediation paths (moderators 'coping' and 'resilience' not included). *Panel 3*: Moderation models tested separately from the main path analysis model.

The functionality of this method introduces data-based corrections to the test statistic and standard errors to offset the bias introduced by the non-normal distribution (Finney & DiStefano, 2006).

Results

PA1: Perceptions of past parenting are associated with suicidal ideation through the indirect path that includes attachment dimensions, defeat, and entrapment, respectively, adjusting for depressive symptoms

The SEM model represented in Panel 2 was tested at once and the results are presented in Panel 4 (Figure B). Estimates on the arrows indicate standardized regression betas. With regard to goodness of fit, the chi-square test for the hypothesized model was X^2 = 747.139, df = 21, p < .0001. Considering that chi-square test is highly reliant on the degrees of freedom, other indices should be also taken into account to determine model fit, particularly when failing this test (Iacobucci, 2010; Kline, 2011). The overall model did not achieve good fit. Fit was evaluated through several additional measures (thresholds based on Hu & Bentler, 1999), with Root Mean Square Error of Approximation (RMSEA) = 0.229 (95%C.I. = 0.215; 0.243) indicating *bad* acceptable fit, Standardized Root Mean Square Residual (SRMR) = 0.183 above the threshold for good fit (< 0.09), Comparative Fit Index (CFI) = 0.708 indicating *permissible* fit, and Tucker-Lewis Index (TLI) = 0.514.

PA2: Coping moderates the relationship between defeat and entrapment, adjusting for depressive symptoms

The first moderation model (Moderation 1, Panel 5, Figure B) shows similar results to the mediated moderated model of the manuscript (Figure 2, Panel C). Although defeat,

maladaptive coping, and entrapment are associated, the *defeat-maladaptive coping* interaction did not show to be statistically significant to predict entrapment (β = 0.0036; *SE* = 0.0352; 95% C.I. = -0.07, 0.07; *p* = 0.918), suggesting the absence of an interaction effect in the data.

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PA3: Resilience moderates the relationship between entrapment and suicidal ideation, adjusting for depressive symptoms

The second model (Moderation 2, Panel 6, Figure B) also indicated similar findings to the last mediated moderated model conducted in our manuscript (Figure 2, Panel D), in which resilience seems to moderate the relationship between entrapment and suicidal ideation (β = -0.0031; *SE* = 0.0008; 95% C.I. = -0.005, -0.001; $p < 0.001$). Similar to Figure 3, the right-hand side interaction graph of Panel 6 (Figure B) indicates that it is when entrapment is high and resilience is low that suicidal ideation is at its highest. Concomitantly, at higher levels of entrapment, those who reported higher resilience showed lower levels of suicidal ideation than participants who reported lower scores of resilience.

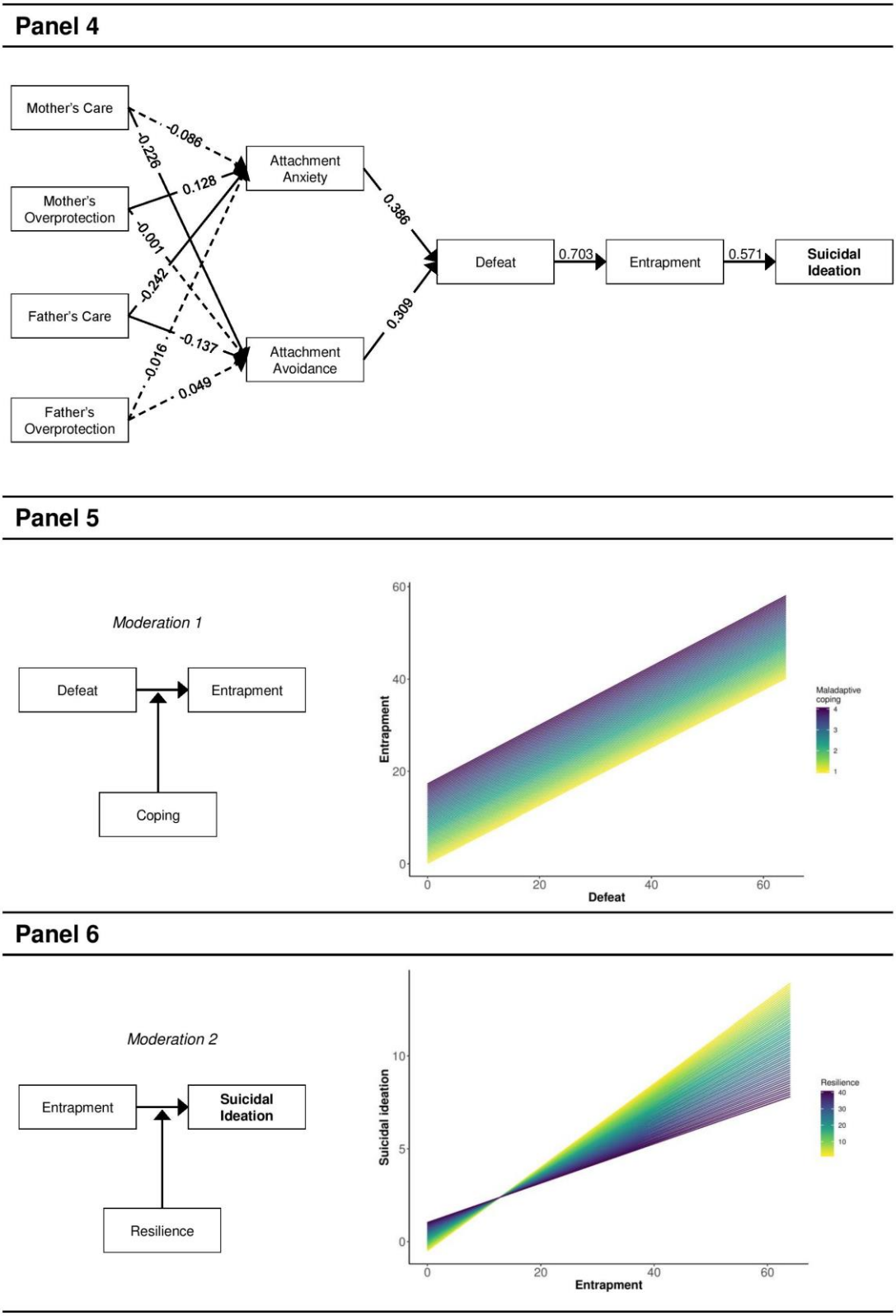

Figure B. *Panel 4*: Final serial multi-mediation model tested through Structural Equation Modeling (SEM) including standardized regression values. Dashed lines represent non-significant statistically association at the level $p < 0.05$. *Panel 5 and 6*: Show the moderation models (left hand side) and the moderation graphs (right hand side).

Further considerations and methodological challenges

The reviewer highlighted the very interesting point that in order to provide a more complete test of the IMV model, the analysis should be modelled altogether in one rather than through separate models. Although testing the IMV model as a whole was outside the scope of our study, we gave the thoughtful consideration to our reviewer's suggestion. However, their suggestion has highlighted a number of issues, as discussed below.

Statistical testing of theoretical complexity.

Not only in the field of suicidology but in behavioral sciences as a whole, a real challenge is the development of statistical procedures that allow researchers to test complex theoretical frameworks such as the IMV model of suicidal behaviour (O'Connor & Kirtley, 2018). Although we appreciate the reviewer's ambition to account for a multiple range of complex relationships and interactions in our statistical analysis, we acknowledge that the field of complexity testing within psychopathology and suicide research is quite new, with important discussions happening at the moment which can be extended to suicide research (e.g., Fried & Cramer, 2017; Robinaugh et al., 2019).

Several attempts to account for such complexity have been made through the use of statistical techniques that are still under development such as network analysis (e.g., Borsboom & Cramer, 2013; De Beurs, 2017; De Beurs et al., 2019; Shiratori et al., 2014), and different techniques of machine learning (e.g., Just et al., 2017; Linthicum, Schafer, & Ribeiro, 2019; Walsh, Ribeiro, & Franklin, 2017). However, in our attempt to address the reviewer's request, we were unable to test the model represented in Panel 1 (Figure A). Therefore, methodological advances should be made in order to address important questions such as how complex models such as the IMV model could be tested at once, including

multiple moderators, parallel mediators, and serial mediators, keeping the theoretical assumptions posited by those theoretical frameworks (e.g., entrapment bridges the gap between defeat and suicidal ideation). Although the IMV model has been tested in different ways (e.g., De Beurs et al., 2019; Dhingra, Boduszek & O'Connor, 2015; Forkmann et al., 2018; Wetherall et al., 2018; Wetherall et al., 2019), we are unaware of any attempt to test the model in such a comprehensive way (i.e., including multiple moderators, parallel mediators, and serial mediators).

Hypothesis testing and exploratory analysis.

Another important consideration should be noted: considering that we have tested five hypotheses in the current paper informed by the literature on parenting, attachment, and suicide risk, and the theoretical premises of the IMV model, the current analysis presented in this supplementary material serves only an exploratory function and does not replace the main analyses of the paper. The benefit of our original analyses presented in the paper is that they are genuinely *a priori*, whereas any unified model proposed indicates partially what we already know about the data. Therefore, the analysis presented in this supplementary material has to be interpreted with extreme caution. The *a priori* elements of the planned analyses are consistent with the IMV model. We have been careful throughout not to pitch this as a global test of the IMV, but of simultaneous key elements of it in the context of understanding the parenting perceptions-attachment-suicide risk relationship. Although exploratory analyses are extremely important to the development of hypotheses to be tested in new datasets, we understand that both research practices should not be conducted within the same dataset, as this increases type I error rates.

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