UNDERSTANDING EMPLOYEE RESPONESES TO STRESSFUL INFORMATION SECURITY REQUIREMENTS: A COPING PERSPECTIVE

SUPPLEMENTAL ONLINE APPENDIX

MORAL DISENGAGEMENT OR NEUTRALIZATION THEORY?

There is conceptual and operational overlap between moral disengagement mechanisms and certain techniques of neutralization as applied to extant studies of IS security-related behavior [4, 7, 13]. Most notably, in comparing our study to Siponen and Vance's [13] study of employee neutralization of ISP violations, several of the moral disengagement mechanisms are close analogs to their neutralization techniques: (i) our moral justification mechanism is similar to their appeal to higher loyalties and defense of necessity techniques; (ii) both our displacement and diffusion of responsibility mechanisms are similar to their denial of responsibility technique; (iii) our distortion of consequences mechanism is similar to their denial of injury technique; (iv) and our attribution of blame mechanism is similar to their condemn the condemners technique. Additionally, several of our moral disengagement measurement items (see Table A3 in the main paper) are similar to their items used to measure neutralization techniques (e.g., our "It is alright to share a password to get work done" compared to Siponen and Vance's "It is alright to violate a company information security policy to get the job done"). While recognizing that both theories are congruent, we selected MDT for the following reasons:

- Certain criminological scholars have pointed out that neutralization theory has hardly evolved since its inception over five decades ago and instead that social psychological research using MDT has done the most to advance our understanding of neutralization and related rationalization techniques [5, 8]. This development is consistent with much criminological theory and scientific theory accumulation in general as "new theories build upon the foundation of their forerunners" [5, p. xvi]. Although newer does not necessarily mean better, we consider MDT an alternative, contemporary lens for understanding cognitive rationalizations used to justify deviant and self-serving behavior.

- Related to the previous point, theoretical advances have considered a host of personal and situational influences that drive moral disengagement mechanisms [e.g., 3, 10]. This broader conceptualization of MDT reflects its foundation in social cognitive theory [1, 2], which posits that conduct cannot be disembodied from sociostructural arrangements, and therefore social context (i.e., environmental influences) plays a major role in shaping the deactivation of self-sanctions. Neutralization theory, on the other hand, does not presuppose the influence of social realities and has a more intrapsychic focus based on its roots in ego psychology [8]. Although neutralization techniques have been integrated into theoretical frameworks that include social factors (e.g., differential association theory; see [8]), we submit that MDT better lends itself to our specific antecedents, which are embedded in the social context of the workplace.
- Neutralization theory does not contain all of the cognitive processes described in MDT, nor have all of the neutralization techniques been empirically investigated in IS security studies. Specifically, there is no neutralization theory counterpart for MDT's palliative comparison mechanism, and thus this cognitive process was not included in Siponen and Vance's [13] application of neutralization theory to ISP violations. We also note that Siponen and Vance did not include counterparts to MDT's euphemistic labeling and dehumanization mechanisms. Additionally, Bandura and others [11, 12] assert that MDT differs from neutralization theory in the following ways: (1) MDT's moral justification mechanism is a more elaborate concept, based on social imperatives, compared to the narrower concept of appeal to higher loyalties in neutralization theory; and (2) MDT distinguishes between different forms of nonresponsibility (displacement and diffusion) to obscure personal accountability. Based on these points, we contend that MDT provides additional insight (beyond neutralization theory) into the cognitive rationalization processes used to justify ISP violations.
- Finally, although not directly related to the distinction between MDT and neutralization theory, we note that our measurement of moral disengagement mechanisms is behavior-specific (i.e., the ISP violations in our scenarios). This approach is consistent with the context-specific nature of MDT [9]

and the emotion-focused aspect of coping theory [6]. Siponen and Vance's neutralization measures pertain to ISP violations in general (e.g., "It is OK to violate the company information security policy if no harm is done"); hence, it is unclear whether their measures are capturing neutralization processes related to any and all types of ISP violations, or strictly those scenario behaviors included in their study. Although Siponen and Vance's neutralization measures offer increased generalizability, we submit that our behavior-specific measures provide a complementary perspective that enables a more nuanced assessment of the influence of cognitive rationalization processes on ISP violations.

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Measurement Model Analysis

We conducted separate confirmatory factors models using SmartPLS: (1) one with the three categories of MD and the moral belief (MB) measure included; and (2) one with the SRS dimensions and ethical orientation, PS, INT, and SDB included. Tables 1 and 2 contain these results and Table 3 contains the criteria for the final measurement model.

The factor analytic results (Table 1) and the correlation table (Tables 4) reveal various cross-loadings and high correlations among the MD categories, suggesting inadequate discriminant validity. To address this issue, and to determine whether a multidimensional representation of MD was justified, we conducted a series of model fitting tests based on Wright et al.'s [1] tutorial for assessing the appropriateness of multidimensional constructs. These analyses were conducted using the covariance-based EQS 6.2 software package (with maximum likelihood estimation selected).

First, we ran a single first-order factor model that included the twenty-four MD indicators (Model 1). Next, we ran a multidimensional model consisting of eight first-order factors (corresponding to the eight MD dimensions; three items each) that were freely correlated (Model 2). According to Wright et al. [1], "a significant improvement in chi-square fit between Model 2 (freely-correlated first-order factors model) and Model 1 (all indicators load on one factor) provides evidence of multidimensionality" (p. 390). Comparison of our two models indicated a better fit for Model 2 based on a chi-square difference test ($\Delta\chi^2 = 720$, $df = 27$, $p < 0.001$) and several model fit indices (unidimensional model: NFI = .889; CFI = .903; RMSEA = .108; multidimensional model: NFI = .933; CFI = .946; RMSEA = .085). We also used EQS to assess the discriminant validity of the MD dimensions by comparing constrained and freely correlated pairs of factors. We did this for all unique pairs of MD dimensions. If constraining the covariance to 1.0 significantly hampers model fit (i.e., increases the chi-square statistic), then there is evidence of discriminant validity. As shown in the top portion of Table 5, we found significant chi-square differences for all pairs of factors, in support of the discriminant validity of the eight MD dimensions.

Having established the multidimensionality of MD, we next tested whether a second-order factor was appropriate. Recall that Bandura originally specified MD as an overarching concept consisting of three distinct categories that operate in a collective and mutually reinforcing manner, and recent empirical work depicts this as a reflective second-order factor. Following suit, we ran a confirmatory factor model (Model 3) with the twenty-four MD indicators loading onto their respective first-order factors (recontruing the conduct, obscuring or distorting the consequences, devaluing the target) and the three first-order factors loading onto a single second-order factor. This was modeled as a reflective first-order, reflective second-order construct. The results revealed a reasonable fit (χ^2/df = 3.12; NFI = .912; CFI = .926; RMSEA = .068) with all first- and second-order standardized factor loadings significant, and tests of constrained versus freely correlated pairs of first-order factors supported their discriminant validity (see bottom portion of Table 5). Hence, although certainly closely related, the reconstruing the conduct, obscuring or distorting consequences, and devaluing the target categories appear to be unique manifestations of MD, and their high correlations can be captured and explained using a reflective second-order construct.

We also ran a reflective second-order factor model (Model 4) consisting of eight first-order factors (corresponding to the eight MD dimensions). Compared to Model 3, these fit indices were very similar, albeit some slight better (χ^2/df = 2.80; NFI = .919; CFI = .932; RMSEA = .088). We selected the second-order structure in Model 3 for empirical reasons (i.e., more parsimonious model with fewer parameters to be estimated and more degrees of freedom), and more importantly, based on the aforementioned theoretical grounds and prior research. Further, conceptualizing MD with three (as opposed to eight) first-order dimensions enabled a more succinct and less complex theoretical explanation of how SRS influences moral disengagement from ISP violations. As a check, we ran a PLS structural model with MD as a second-order factor consisting of all eight dimensions as first-order factors and there was no substantive change in path coefficients.

Table 1. Loadings and Cross-Loadings for the Three MD Categories and MB				
Item	**RC**	**OC**	**DT**	**MB**
RC1 (MJ1)	**0.87**	0.78	0.76	-0.40
RC2 (MJ2)	**0.93**	0.86	0.82	-0.42
RC3 (MJ3)	**0.93**	0.87	0.86	-0.40
RC4 (PC1)	**0.76**	0.67	0.63	-0.35
RC5 (PC2)	**0.89**	0.81	0.85	-0.39
RC6 (PC3)	**0.84**	0.79	0.72	-0.40
RC7 (EL1)	**0.89**	0.78	0.76	-0.46
RC8 (EL2)	**0.76**	0.69	0.64	-0.34
RC9 (EL3)	**0.91**	0.87	0.85	-0.43
OC1 (DR1)	0.67	**0.77**	0.64	-0.21
OC2 (DR2)	0.52	**0.72**	0.47	-0.17
OC3 (DR3)	0.78	**0.86**	0.74	-0.28
OC4 (DC1)	0.82	**0.85**	0.74	-0.41
OC5 (DC2)	0.81	**0.89**	0.83	-0.40
OC6 (DC3)	0.82	**0.92**	0.76	-0.41
OC7 (DFR1)	0.84	**0.88**	0.80	-0.36
OC8 (DFR2)	0.73	**0.85**	0.76	-0.35
OC9 (DFR3)	0.80	**0.89**	0.81	-0.32
DT1 (AB1)	0.82	0.83	**0.93**	-0.35
DT2 (AB2)	0.86	0.85	**0.92**	-0.37
DT3 (AB3)	0.81	0.83	**0.94**	-0.33
DT4 (DH1)	0.82	0.82	**0.91**	-0.35
DT5 (DH2)	0.74	0.72	**0.88**	-0.28
DT6 (DH3)	0.74	0.77	**0.90**	-0.26
MB1	-0.39	-0.33	-0.31	**0.93**
MB2	-0.47	-0.40	-0.36	**0.92**

Legend: RC = Reconstruing the Conduct; OC = Obscuring or Distorting Consequences; DT = Devaluing the Target; MB = Moral Belief

Table 2. Loadings and Cross-Loadings for SRS Dimensions, Idealism, Relativism, Perceived Sanctions, Social Desirability Bias, and ISP Violation Intention*								
Item	**CX**	**INT**	**OL**	**PS**	**SDB**	**UC**	**IDEAL**	**REL**
CX2	**0.78**	0.29	0.57	-0.01	-0.07	0.43	0.29	0.21
CX3	**0.85**	0.36	0.53	-0.09	-0.18	0.29	0.35	0.25
CX4	**0.88**	0.34	0.62	-0.05	-0.18	0.37	0.34	0.26
CX5	**0.83**	0.26	0.64	0.04	-0.12	0.50	0.26	0.23
CX6	**0.87**	0.40	0.71	-0.05	-0.22	0.40	0.40	0.22
INT1	0.37	**0.96**	0.29	-0.30	-0.14	0.10	-0.19	0.19
INT2	0.39	**0.97**	0.29	-0.36	-0.15	0.09	-0.20	0.20
OL1	0.60	0.25	**0.86**	0.06	-0.03	0.47	-0.05	0.23
OL2	0.65	0.25	**0.88**	0.09	-0.05	0.49	-0.03	0.29
OL3	0.73	0.27	**0.87**	0.07	-0.13	0.47	-0.14	0.19
OL4	0.64	0.25	**0.81**	0.09	-0.04	0.54	-0.05	0.20
PS1	-0.04	-0.30	0.07	**0.92**	0.16	0.19	0.27	-0.05
PS2	-0.06	-0.32	0.03	**0.88**	0.20	0.18	0.30	0.06-
PS3	-0.05	-0.27	0.05	**0.87**	0.19	0.16	0.22	-0.04
PS4	-0.07	-0.29	0.05	**0.84**	0.24	0.18	0.26	-0.06
PS5	0.04	-0.33	0.14	**0.93**	0.15	0.25	0.30	-0.03
PS6	0.03	-0.32	0.14	**0.93**	0.14	0.25	0.31	-0.05
SDB1	-0.02	-0.08	0.05	0.14	**0.69**	0.20	0.44	0.06
SDB2	-0.02	-0.09	0.07	0.18	**0.80**	0.22	0.48	0.09
SDB3	-0.07	-0.10	0.03	0.19	**0.81**	0.17	0.55	0.05
SDB5	-0.20	-0.11	-0.15	0.19	**0.71**	0.06	0.59	-0.04
UC1	0.47	0.10	0.54	0.18	0.13	**0.90**	0.10	0.21
UC2	0.29	-0.01	0.36	0.27	0.22	**0.71**	-0.01	0.06

UC3	0.39	0.05	0.53	0.24	0.12	**0.85**	0.05	0.12
UC4	0.40	0.08	0.45	0.22	0.10	**0.88**	0.08	0.09
IDEAL1	-0.14	-0.14	-0.06	0.22	0.59	0.15	**0.79**	-0.04
IDEAL2	-0.12	-0.18	-0.08	0.24	0.55	0.17	**0.80**	0.01
IDEAL3	-0.11	-0.19	-0.05	0.25	0.54	0.17	**0.85**	-0.05
IDEAL4	-0.15	-0.17	-0.09	0.32	0.53	0.07	**0.86**	-0.06
IDEAL5	-0.17	-0.16	-0.12	0.21	0.58	0.12	**0.89**	-0.03
IDEAL6	-0.16	-0.19	-0.09	0.24	0.53	0.10	**0.87**	-0.02
IDEAL8	-0.02	-0.13	0.06	0.29	0.51	0.15	**0.73**	0.02
REL2	0.14	0.11	0.17	-0.03	0.11	0.11	-0.03	**0.71**
REL5	0.19	0.10	0.20	0.02	0.07	0.20	0.02	**0.68**
REL6	0.18	0.12	0.17	0.01	0.14	0.16	0.01	**0.66**
REL7	0.27	0.19	0.26	-0.01	0.01	0.18	-0.01	**0.82**
REL8	0.21	0.18	0.24	-0.03	0.09	0.16	-0.03	**0.77**
REL9	0.25	0.18	0.21	-0.09	-0.07	0.12	-0.09	**0.81**
REL10	0.22	0.14	0.18	-0.08	-0.05	0.08	-0.08	**0.80**

Legend: CX = SRS-Complexity; INT = ISP Violation Intention; OL = SRS-Overload; PS = Perceived Sanctions; SDB = Social Desirability Bias; UC = SRS-Uncertainty; IDEAL = Idealism; REL = Relativism; * The following items were dropped due to poor loadings or cross-loadings: CX1, SDB4, IDEAL7, IDEAL9, IDEAL10, REL1, REL3, REL4.

Table 3. Measurement Model Loadings, AVEs, and Reliability Statistics

Second Order Construct	First Order Construct	Item	Item Loading	t-statistic	AVE	CR	CA
Security-Related Stress (SRS)	SRS-Complexity (CX)	CX2	.78	11.66	.72	.92	.90
		CX3	.85	19.37			
		CX4	.88	24.19			
		CX5	.83	15.85			
		CX6	.87	23.22			
	SRS-Overload (OL)	OL1	.86	11.81	.73	.91	.88
		OL2	.88	12.25			
		OL3	.87	15.42			
		OL4	.81	10.66			
	SRS-Uncertainty (UC)	UC1	.90	3.23	.70	.90	.88
		UC2	.71	2.60			
		UC3	.85	3.88			
		UC4	.88	4.02			
N/A	Perceived Sanctions (PS)	PS1	.92	29.33	.80	.96	.95
		PS2	.88	27.65			
		PS3	.87	19.81			
		PS4	.84	17.74			
		PS5	.93	47.65			
		PS6	.93	42.14			
N/A	Social Desirability Bias (SDB)	SDB1	.75	2.933	.62	.87	.79
		SDB2	.83	3.243			
		SDB3	.83	4.062			
		SDB5	.73	2.581			
N/A	ISP Violation Intention (INT)	INT1	.96	71.08	.94	.96	.94
		INT2	.97	97.04			
Moral Disengagement (MD)	Reconstruing the Conduct (RC)	RC1 (MJ1)	.87	36.75	.75	.96	.95
		RC2 (MJ2)	.93	74.87			
		RC3 (MJ3)	.93	50.28			
		RC4 (PC1)	.76	16.30			
		RC5 (PC2)	.89	41.08			
		RC6 (PC3)	.84	29.28			
		RC7 (EL1)	.89	41.13			
		RC8 (EL2)	.76	20.45			
		RC9 (EL3)	.91	45.12			
	Obscuring or Distorting Consequences (OC)	OC1 (DR1)	.77	27.69	.71	.95	.94
		OC2 (DR2)	.72	22.69			
		OC3 (DR3)	.86	28.05			

		OC4 (DC1)	.85	35.07			
		OC5 (DC2)	.89	85.31			
		OC6 (DC3)	.92	60.63			
		OC7 (DFR1)	.88	37.47			
		OC8 (DFR2)	.85	32.22			
		OC9 (DFR3)	.89	59.14			
	Devaluing the Target (DT)	DT1 (AB1)	.93	43.56	.83	.95	.95
		DT2 (AB2)	.92	69.98			
		DT3 (AB3)	.94	82.14			
		DT4 (DH1)	.91	46.42			
		DT5 (DH2)	.88	35.57			
		DT6 (DH3)	.90	40.54			
N/A	Moral Belief (MB)	MB1	.93	16.72	.87	.93	.85
		MB2	.95	53.33			
N/A	Idealism (IDEAL)	IDEAL1	.79	8.02	.70	.94	.93
		IDEAL2	.80	8.03			
		IDEAL3	.85	7.87			
		IDEAL4	.86	6.21			
		IDEAL5	.89	6.78			
		IDEAL6	.87	6.71			
		IDEAL8	.73	6.20			
N/A	Relativism (REL)	REL2	.71	6.13	.56	.90	.87
		REL5	.68	4.99			
		REL6	.66	4.61			
		REL7	.82	9.76			
		REL8	.77	8.03			
		REL9	.81	11.18			
		REL10	.80	13.13			

Legend: AVE = Average Variance Extracted; CR = Composite Reliability; CA = Cronbach's Alpha

Table 4: Latent Variable Correlations

Construct	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
OL(1)	3.29	1.15	**.85**											
CX(2)	3.01	1.44	.73	**.85**										
UC(3)	4.04	1.48	.55	.43	**.86**									
RC(4)	3.18	1.62	.27	.41	.06	**.86**								
OC(5)	3.14	1.55	.30	.43	.08	.89	**.84**							
DT(6)	2.53	1.53	.37	.50	.12	.87	.86	**.92**						
INT(7)	2.82	1.95	.30	.39	.07	.63	.57	.62	**.97**					
MB(8)	4.82	1.84	.03	-.01	.11	-.46	.38	-.36	-.37	**.93**				
PS(9)	4.76	1.68	.09	-.04	.26	-.52	-.44	-.39	-.34	.51	**.89**			
SDB(10)	5.50	0.99	.01	-.11	.24	-.14	-.12	-.16	-.12	.18	.22	**.79**		
IDEAL(11)	5.67	1.09	-.07	-.15	.18	-.19	-.14	-.24	-.20	.25	.31	.65	**.84**	
REL(12)	4.14	1.24	.28	.28	.15	.30	.29	.28	.20	-.11	-.04	.06	-.01	**.75**

Legend: Bold values are square root of AVEs; OL = SRS-Overload; CX = SRS-Complexity; UC = SRS-Uncertainty; RC = Reconstruing the Conduct; OC Obscuring or Distorting Consequences; DT = Devaluing the Target; INT = ISP Violation Intention; MB = Moral Belief; PS = Perceived Sanctions; SDB = Social Desirability Bias; IDEAL = Idealism; REL = Relativism

Table 5: Assessment of Discriminant Validity of Eight MD Dimensions

Dimensions	Unconstrained Model χ^2	Constrained Model χ^2	$\Delta\chi^2$*
AB with…			
DC	23.86	177.53	153.67
DFR	35.49	200.56	165.07
DH	63.68	219.81	156.13
DR	17.87	99.99	82.11
EL	21.73	187.62	165.89
MJ	46.37	208.12	161.75
PC	23.27	88.23	64.96

DC with…			
DFR	36.51	160.49	123.98
DH	79.11	180.76	101.65
DR	28.63	103.53	74.90
EL	43.83	213.23	169.40
MJ	86.35	231.04	144.69
PC	11.03	80.69	69.67
DFR with…			
DH	29.58	125.24	95.66
DR	38.90	133.83	94.83
EL	33.25	203.37	170.13
MJ	47.59	194.84	147.25
PC	29.81	93.38	63.57
DH with…			
DR	35.26	83.54	48.28
EL	59.31	167.01	107.70
MJ	78.38	177.08	98.70
PC	41.92	79.32	37.40
DR with…			
EL	38.81	144.57	105.77
MJ	26.32	107.06	80.74
PC	12.04	52.70	40.66
EL with…			
MJ	171.59	367.50	195.90
PC	35.52	134.51	99.00
MJ with…			
PC	18.91	93.51	74.60
Assessment of Discriminant Validity of Three MD Categories			
DT with…	577.68	704.43	126.75
RC	650.52	716.79	66.27
OC			
RC with…	986.91	1070.40	83.49
OC			
* All change in χ^2 are significant at $p < .001$ based on one degree of freedom			

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Assessment of Common Method Variance (CMV)

Common method variance (CMV) is an issue because all variables were obtained from a single respondent using the same instrument. The decision to use scenarios and their related perceptual measures dictated the use of single respondents. We attempted to avoid CMV by ensuring respondent anonymity, counterbalancing item order, using different scale anchors where possible, and creating psychological separation between most of the independent and dependent variables on the survey [2, 3]. We also performed the following statistical tests to assess the potential effects of CMV in our results.

We used EQS and performed a confirmatory factor analysis by specifying a single, first-order factor that was comprised of all the items used to measure the constructs in our study. The results indicated a poor model fit (NFI = .557; CFI = .579; RMSEA = .159). Next, a first-order method factor (comprised of all the items used to measure the study constructs) was added to both the single first-order factor model (unidimensional) and the eight first-order factor model (multidimensional) discussed in the previous section. The fit indices of both models with the method factor were substantially worse than those of the original models. Together, these tests suggest that CMV was not a serious concern [3].

We also performed the marker variable technique in which a theoretically unrelated construct is used to adjust correlations among the study variables to account for CMV. We planned for this a priori and included a marker variable called outside activity (OA) in our survey (see Appendix A in the main paper for items). OA's average correlation with the principal study variables (r =.03) was used as the CMV estimate. From this we developed a CMV-adjusted correlation matrix and examined the CMV-adjusted structural relationships in our model using EQS. The direction and significance of the hypothesized paths remained unchanged from Figure 2 with only a minimal drop in variance explained for the MD and INT. Collectively, the above statistical tests provide reasonable evidence that CMV was not substantial, although we acknowledge their limitations [e.g., 1]. We also highlight the low correlation (r =.01) between SDB and OL (Table 5 in the previous section) as additional evidence that CMV was not prevalent [2].

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