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Adaptation of the CAD Scale to Japanese Parents: The Domains for Moral Violations in the CAD Triad Hypothesis

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Abstract

Background: The domains for moral emotions are still open to debate. Rozin et al.'s (1999) CAD triad hypothesis assumed selective, corresponding ties between three moral codes (community [C], autonomy [A], and divinity [D]) and three other-critical emotions (contempt [C], anger [A], and disgust [D]). **Objective:** To identify domains for violations of the big three moral codes in the CAD Scale and to examine the robustness of its 3-factor structure among a Japanese population. **Methods:** We used the data for a group of Japanese parents (n = 260) to whom the CAD Scale was distributed on the web. Each domain for the CAD hypothesis was analysed separately. Correlations between CAD Scale items and the total scores of the three domains, and alpha coefficients of the items belonging to each domain were calculated. Items with the highest correlation with another domain were deleted. A one-factor exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) of the items for each domain for the 1-factor model were performed. Because 1-factor models did not reach satisfactory levels, we examined parcelled CFAs. **Results:** All items showed the highest correlation with the domain assumed by the CAD hypothesis except for items 8, 10, 15, 22, and 41. In the EFAs, all factor loadings showed higher than 0.33, and alpha coefficients of the C, A, and D domains were 0.937, 0.881, and 0.949, respectively. The CFAs

of the 1-factor model for the C, A, and D domains did not show an acceptable fit. Parcelled models for each domain showed a perfect fit to the data in each domain of the CAD scale (χ^2 = 0.000, CFI = 1.000, RMSEA = 0.000). **Conclusion:** These results support the 3-factor structure of the CAD Scale.

Keywords

CAD Hypothesis, Moral Ethics, Factor Structure, Validity, Parents

1. Introduction

Emotions are strongly connected to moral judgements within our minds, involving social relationships, and motivating moral behaviours. Over the decades, the questions of what moral emotions are and how to identify them have been debated among emotion researchers. Moral emotions can be divided into two main contexts: self-conscious emotions (e.g., shame, embarrassment, and guilt, [Tangney, 1991; Tangney & Dearing, 2002; Tangney et al., 2007]) and other-critical emotions (e.g., contempt, anger, and disgust [Haidt, 2003; Haidt et al., 1997; Rozin et al., 1999]). Contempt, anger, and disgust correspond to the big three moral ethics theories (community, autonomy, and divinity [Shweder et al., 1990]). From here, Rozin et al. (1999) proposed the CAD triad hypothesis which assumed selective ties between three moral codes (community [C], autonomy [A], and divinity [D]) and three other-critical emotions (contempt [C], anger [A], and disgust [D]) corresponding to each other. The three moral codes and their matched other-critical emotions are named the CAD triad. Violations of community elicit contempt, violations of autonomy elicit anger, and violations of divinity elicit disgust (Haidt, 2003; Hutcherson & Gross, 2011; Rozin et al., 1999). In Rozin et al.'s (1999) experimental study in the United States and Japan, descriptions of situations that involve one of the three types of moral violations (community, autonomy, and divinity violations) were presented to participants who were asked to choose only one appropriate facial expression and only one appropriate emotion (contempt, anger, or disgust). The results supported the CAD triad hypothesis (Rozin et al., 1999). Heerdink et al. (2019) investigated how the emotional reactions of others shape norms about potential norm violations by different types of stimuli using video clips. In these results, participants interpreted others' emotional reactions of anger as violations of autonomy and others' emotional reactions of disgust as violations of purity (Heerdink et al., 2019). Thus, an anger expression means primarily violations of autonomy norms and a disgust expression means violations of divinity norms. Immediate reactions to violations of morals, including facial expressions, let others know the reasons why someone's behaviours are inappropriate. Therefore, domains of moral codes as elicitors of those emotions need to be identified. Contempt, anger, and disgust are included in universal emotions, which are expressed via the central nervous system automatically, immediately, as facial expressions (Ekman

& Friesen, 1975; Ekman et al., 1987).

However, the specific ties between moral emotions and moral codes were not without refutation. Cameron et al. (2015) claimed that these ties between moral codes and moral emotions are not exclusive if participants were free to indicate mixed emotions. For example, the use of disgust words is more strongly related to anger words and less strongly related to facial representations of disgust (Gutierrez et al., 2012). Several other studies are also inconsistent with one-to-one ties between moral violation content and emotions (Molho et al., 2017; Hutcherson & Gross, 2011). Royzman et al. (2014) claimed that anger was the principal emotional response to moral transgression regardless of normative content. Landmann and Hess (2018) found that compassion and disgust were associated with care and divinity, respectively, whereas anger, rage, contempt, resentment, and fear were not associated with any single moral transgression. Moral emotions have multiple theoretical aspects. Sunar et al. (2021) proposed an alternative model from a functional view of moral emotions including both self-conscious and other-critical emotions. In this model, morally relevant actions and judgements occur within the social context. For example, a sense of guilt functions to guide our behaviour to achieve cooperation. This hypothesis was supported among Japanese population by Oda and Sawada (2021).

Moral ethics theory was initiated by Rozin and was extended as moral foundation theory by Haidt and Joseph (2004). Haidt and Joseph proposed five foundations as several innate psychological systems at the core of ethics. They were Care, Fairness, Loyalty, Authority and Purity. This was strongly supported across various cultures (Graham et al., 2013). Moral foundation theory gives importance to rational models of morality. However, it is emotions that direct to what we should behave (Baumeister et al., 2007; Eisenberg & Spinrad, 2004; Ekman, 2003; Ekman & Friesen, 1975; Ekman et al., 1987; Gross, 1998). In our investigation (Hada et al., 2023), we were interested in emotions of people with a child. Hence, we adopted Rozin's moral ethics theory that had specific ties with moral codes.

Rozin and colleagues validated their CAD questionnaire among US and Japanese population. Since then, there have been no other studies regarding other-critical emotions based on the theoretical hypotheses among a Japanese population for more than a couple of decades. In addition, the moral codes assumed by the CAD hypothesis have been less studied than moral emotions per se. moral emotions may vary according to culture and time. By identifying the domains of moral codes, we may know the reason why people express emotions, and what motivates them to behave in social relationships. Cultural differences in emotions in morals are another important issue in emotion studies. In this report, we examine the adaptation of the CAD Scale dealing with moral emotions to Japanese parent populations. Identifying the domains of the violations of the big three moral codes and accompanying emotions in the CAD Scale and examining the robustness of the factor structure may contribute to finding obvious evidence for moral codes assumed by the CAD hypothesis in the Japanese culture.

2. Methods

2.1. Measurement

We used the Japanese version of the CAD Scale (Rozin et al., 1999) to measure feelings of displeasure underlying the CAD hypothesis. The instruction "This questionnaire describes various situations that people experience. How do you feel when you see these situations?" was followed by 46 items describing situations that assume violations of community (C), autonomy (A), or divinity (D) rated on a 5-point scale (not at all = 1 to I feel extreme displeasure = 5). Contempt, anger, and disgust are "displeasure" sensations. If examinees are asked the intensity of distinct emotions (e.g., "Do you feel contempt when you see these situations?"), the individual range of sensitivities of contempt, anger, and disgust of the examinees may affect the results. To identify domains of the violations assumed in the CAD hypotheses, only displeasure sensations towards situational settings based on the big three moral ethics theory should be asked. Therefore, we used the expression "How do you feel when you see these situations?" to rate (generic and mild) displeasure. The license to use this scale was given by the original authors. Item 12 in the CAD scale was deleted from the analyses because items 5 and 12 were the same sentences in our resource provided by the Japanese author of the CAD scale.

2.2. Study Procedures and Participants

The data came from a part of the study for the validation of the Scale of Parent-to-Child Emotions (Hada et al., 2023), which was conducted on the web. The participants consisted of 1560 parents who had at least one child (including a foetus). The ratio of fathers and mothers was even. All participants were allocated into six groups to respond to different questionnaires. In this report, we used the data of the group (n = 260), which included responses to the CAD scale. The participants' mean (SD) age was 40.6 (8.8) and 34.7 (8.3) years for men (fathers) and women (mothers), respectively. This web survey was conducted with the cooperation of Cross Marketing Inc. (Shinjuku, Tokyo). The web survey was from the 26th to the 30th of May 2023. The goal and the procedure of the survey were explained to all participants and they were assured that it was voluntary and anonymous. Participants agreed to participation in this study on the web.

2.3. Data Analysis

Content validity of all the items was referred to descriptions of definitions for the three moral codes (see Appendix 2). First, we examined the correlations of all the items with the total scores of the three domains. Items with the highest correlation with the other domains were deleted from the subsequent analyses. We then performed analyses separately for the C, A, and D domains. After calculating mean, SD, skewness, and kurtosis of all the items, a one-factor exploratory factor analysis (EFA) of the items for each domain was performed. The items of each domain were subjected to a confirmatory factor analysis (CFA) for

the 1-factor model. (see Appendix 1) The models' goodness-of-fit was examined by a few indices. A good fit was defined as chi-squared (χ^2) divided by degrees of freedom (χ^2/df) < 2, comparative fit index (CFI) > 0.97, and root mean square error appropriation (RMSEA) < 0.05. An acceptable fit was defined as χ^2/df < 3, CFI > 0.95, and RMSEA < 0.08 (Bentler, 1990; Schermelleh-Engel et al., 2003). If the 1-factor model did not reach a satisfactory level, we examined parcelled CFAs. A parcel is a sum of two or more items to create more reliable indicators in the same construct (Kishton & Wideaman, 1994; Little et al., 2002; Little et al., 2013; Matsunaga, 2008). The technique of using parcels as an indicator of constructs was accompanied by several controversies for a couple of decades (Meade & Kroustalis, 2006; Little et al., 2013; Little et al., 2022; Matsunaga, 2008; Rioux et al., 2020). The arguments against item parcelling are the issues of estimation bias, model misspecification, (Bandalos & Finney, 2001; Hall et al., 1999), and masking differences between groups (Meade & Kroustalis, 2006). To deal with those issues, many researchers recommended that item parcelling should be used when items assume a unidimensional construct (Bandalos & Finney, 2001; Kishton & Widerman, 1994; Little et al., 2002; Matsunaga, 2008). EFA (Hall et al., 1999; Matsunaga, 2008) and examination of reliability (e.g., alpha coefficient > 0.60) (Kishton & Widerman, 1994) are preliminary steps to use the item parcelling technique. Therefore, we calculated alpha coefficients for each domain after EFAs. When unidimensional constructs for each C, A, and D domain were assured, we proceeded to item parcelling with the random algorithm. The random algorithm is a method in which items are allocated to parcels randomly, with average numbers of items across parcels, without repetition (Matsunaga, 2008; Little et al., 2002; Little et al., 2013). The random algorithm is reasonable as a stratagem because it can be a good strategy if there are a large number of samples (N > 200), many items, high item communality, and item diversity (Little et al., 2013; Little et al., 2022). After creating parcels, we examined parcelled CFA and compared goodness-of-fit indices of those models with item-level models.

3. Results

The correlations of each item with the total scores of the three domains showed that, overall, almost all the items were significantly correlated with the domain assumed by the CAD hypothesis (**Table 1**).

However, five items showed the highest correlation with total score of the domain other than that derived from theory. Thus, in the C domain, item 8 "A PERSON is seeing and hearing an employee unjustifiably complain to his/her boss" and item 10 "A PERSON is seeing someone attempt to cut into a long line" showed the highest correlation with the A domain. In the A domain, item 15 "A PERSON is looking at a picture of the inmates at a World War II concentration camp being led into the gas chamber by the Nazis" and item 22 "A PERSON is being told about an acquaintance who embezzled from a bank" showed the highest correlation with the D domain. In the D domain, only item 41 "A PERSON

Table 1. Correlations (r) between items and total scores for each domain of the CAD scale.

CAD item No.	Contents / Abbreviations (Japanese)	Community total score	Autonomy total score	Divinity total score
C domain				
8	COMPLAIN	0.632	**0.637**	0.526
9	FUMNERAL	**0.667**	0.593	0.571
10	JUMPQUEUE	0.683	**0.742**	0.623
14	SALESMAN	**0.682**	0.554	0.580
19	EMPSCPLD	**0.727**	0.587	0.605
20	TEENEAT	**0.655**	0.425	0.526
23	FIRSTNAME	**0.759**	0.633	0.687
28	TRAIN	**0.720**	0.577	0.621
33	CURSE	**0.784**	0.686	0.724
34	TEACHER	**0.723**	0.554	0.608
36	CLEANER	**0.755**	0.478	0.592
37	CRITBOSS	**0.784**	0.588	0.639
38	REDLIGHT	**0.752**	0.637	0.640
39	BUSSEAT	**0.731**	0.675	0.662
43	FLAG	**0.787**	0.696	0.747
46	PSEUDOLOGIA	**0.801**	0.624	0.719
A domain				
2	BUMPINTO	0.515	**0.621**	0.470
3	INSURANCE	0.549	**0.766**	0.564
4	SCOLDHIT	0.454	**0.537**	0.363
5	NONSMOKER	0.442	**0.564**	0.430
6	STEALBEG	0.545	**0.793**	0.577
7	BIGOT	0.638	**0.788**	0.621
11	CYANIDE	0.568	**0.763**	0.588
12	-			
15	WWIICONC	0.647	0.626	**0.667**
22	EMBEZILE	0.721	0.742	**0.774**
31	LINE	0.666	**0.761**	0.667
35	BEATWIFE	0.664	**0.793**	0.706

Continued

D domain				
1	WATCHDOGPOOP	0.421	0.451	**0.499**
13	DANDRUFF	0.709	0.663	**0.778**
16	APPLWORM	0.679	0.665	**0.788**
17	OTHERCOCKROACH	0.585	0.686	**0.744**
18	BITTER	0.602	0.453	**0.608**
21	CORPSE	0.633	0.653	**0.762**
24	TOUCHCADAVER	0.683	0.660	**0.794**
25	SEX1770	0.666	0.683	**0.767**
26	CRASHEDCADAVER	0.611	0.662	**0.787**
27	MURDERERSSWEATER	0.671	0.687	**0.806**
29	WATCHSTOOL	0.608	0.578	**0.730**
30	CUTWRIST	0.581	0.683	**0.732**
32	OWNCOCKROACH	0.617	0.697	**0.758**
40	STEPONPOOP	0.621	0.486	**0.666**
41	SOUR	**0.560**	0.334	0.517
42	ROTTENEGG	0.683	0.594	**0.774**
44	INCEST	0.690	0.620	**0.769**
45	ROTMEAT	0.666	0.635	**0.803**

Note. All correlations are significant. The highest correlation indices among 3 domains are in bold.

is eating something extremely sour" showed the highest correlation with the C domain. Therefore, items 8, 10, 15, 22, and 41 were deleted.

Skewness and kurtosis for all the items were low (<2 and <4, respectively), assuming normality of the data (Tables 2-4).

In the EFAs, all factor loadings showed higher than 0.33 (Costello & Osborne, 2005). Alpha coefficients of C, A, and D were 0.937, 0.881, and 0.949 respectively (Tables 2-4). Those results are satisfactory levels to assume unidimensional structures for each domain in the CAD Scale.

Next, CFAs for item-level models were examined. Goodness-of-fit indices for those models did not reach satisfactory levels. CFIs for the C, A, and D domains were 0.902, 0.906, and 0.802, and RMSEAs were 0.103, 0.119, and 0.146, respectively, in 1-factor models. Then we created parcels with the random algorithm (Table 5). Parcelled models for each domain showed a perfect fit to the data in each domain of the CAD scale: $\chi^2 = 0.000$, CFI = 1.000, RMSEA = 0.000 (Table 6). The parcelled models were significantly better than item models in terms of χ^2 per *df.*

Table 2. Mean, SD, skewness, kurtosis, and factor loading of the original and final EFA of Community domain items.

CAD item No.	Contents (Abbreviations)	Mean	*SD*	Skewness	Kurtosis	EFA factor loading
9	FUMNERAL	3.10	1.14	−0.06	−0.72	0.62
14	SALESMAN	3.31	1.19	−0.26	−0.67	0.64
19	EMPSCPLD	3.08	1.21	−0.12	−0.82	0.70
20	TEENEAT	2.78	1.18	0.22	−0.75	0.63
23	FIRSTNAME	3.13	1.20	−0.07	−0.77	0.74
28	TRAIN	3.32	1.21	−0.20	−0.87	0.69
33	CURSE	3.51	1.13	−0.40	−0.39	0.78
34	TEACHER	3.10	1.16	0.06	−0.73	0.72
36	CLEANER	2.87	1.25	0.15	−0.96	0.75
37	CRITBOSS	3.15	1.12	−0.04	−0.63	0.78
38	REDLIGHT	3.26	1.23	−0.17	−0.91	0.73
39	BUSSEAT	3.58	1.12	−0.47	−0.33	0.70
43	FLAG	3.44	1.20	−0.37	−0.63	0.78
46	PSEUDOLOGIA	3.15	1.19	−0.03	−0.79	0.80

Note. Alpha coefficient for all 14 items was 0.937.

Table 3. Mean, SD, skewness, kurtosis, and factor loading of the original and final EFA of Autonomy domain items.

CAD item No.	Contents (Abbreviations)	Mean	*SD*	Skewness	Kurtosis	EFA factor loading
2	BUMPINTO	3.03	1.19	−0.01	−0.68	0.46
3	INSURANCE	3.95	1.12	−1.07	0.60	0.78
4	SCOLDHIT	2.93	1.24	0.09	−1.00	0.36
5	NONSMOKER	2.96	1.30	0.02	−1.06	0.38
6	STEALBEG	4.22	1.09	−1.45	1.41	0.86
7	BIGOT	3.79	1.17	−0.72	−0.29	0.77
11	CYANIDE	4.18	1.13	−1.39	1.17	0.84
31	LINE	3.96	1.10	−1.04	0.58	0.80
35	BEATWIFE	3.85	1.12	−0.91	0.37	0.81

Note. Alpha coefficient for all 9 items was 0.881.

Table 4. Mean, SD, skewness, kurtosis, and factor loading of the original and final EFA of divinity domain items.

CAD item No.	Contents (Abbreviations)	Mean	*SD*	Skewness	Kurtosis	EFA factor loading
1	WATCHDOGPOOP	2.66	1.14	0.25	−0.59	0.42
13	DANDRUFF	3.42	1.16	−0.39	−0.59	0.75
16	APPLWORM	3.38	1.18	−0.30	−0.65	0.75
17	OTHERCOCKROACH	3.94	1.16	−0.97	0.13	0.75
18	BITTER	2.72	1.26	0.15	−1.01	0.51
21	CORPSE	3.69	1.24	−0.62	−0.63	0.76
24	TOUCHCADAVER	3.52	1.24	−0.45	−0.76	0.80
25	SEX1770	3.59	1.26	−0.49	−0.78	0.78
26	CRASHEDCADAVER	3.92	1.17	−0.92	0.05	0.84
27	MURDERERSSWEATER	3.73	1.18	−0.61	−0.43	0.84
29	WATCHSTOOL	3.60	1.23	−0.60	−0.48	0.72
30	CUTWRIST	3.95	1.17	−0.99	0.16	0.77
32	OWNCOCKROACH	3.94	1.15	−0.94	0.12	0.78
40	STEPONPOOP	3.09	1.25	−0.07	−0.93	0.56
42	ROTTENEGG	3.23	1.24	−0.17	−0.84	0.70
44	INCEST	3.46	1.20	−0.34	−0.73	0.73
45	ROTMEAT	3.56	1.22	−0.47	−0.63	0.77

Note. Alpha coefficient for all 17 items was 0.949.

Table 5. Item allocation to parcels for C, A, and D domain.

	Item No.	Contents abbreviation (domain)
Contempt-Community		
Parcel 1 (C1)		
	cad14	SALESMAN (C)
	cad28	TRAIN (C)
	cad37	CRITBOSS (C)
	cad39	BUSSEAT (C)
	cad46	PSEUDOLOGIA (C)
Parcel (C2)		
	cad19	EMPSCPLD (C)
	cad34	TEACHER (C)
	cad36	CLEANER (C)
	cad38	REDLIGHT (C)
	cad43	FLAG (C)

Continued

Parcel 3 (C3)		
	cad9	FUMNERAL (C)
	cad20	TEENEAT (C)
	cad23	FIRSTNAME (C)
	cad33	CURSE (C)
Autonomy-Anger		
Parcel 1 (A1)		
	cad3	INSURANCE (A)
	cad6	STEALBEG (A)
	cad31	LINE (A)
Parcel 2 (A2)		
	cad4	SCOLDHIT (A)
	cad5	NONSMOKE (A)
	cad7	BIGOT (A)
Parce 3 (A3)		
	cad2	BUMPINTO (A)
	cad11	CYNIDE (A)
	cad35	BEATWIFE (A)
Disgust-Divinity		
Parcel 1 (D1)	cad1	WATCHDOGPOOP (D)
	cad25	SEX1770 (D)
	cad30	CUTWRIST (D)
	cad32	OWNCOCKROACH (D)
	cad42	ROTTENEGG (D)
Parcel 2 (D2)		
	cad13	DANDRUFF (D)
	cad18	BITTER (D)
	cad27	MURDERERSSWEATER (D)
	cad29	WATCHSTOOL (D)
	cad40	STEPONPOOP (D)
	cad45	ROTMEAT (D)
Parcel 3 (D3)		
	cad16	APPLWORM (D)
	cad17	OTHERCOCKROACH (D)
	cad21	CORPSE (D)
	cad24	TOUCHCADAVER (D)
	cad26	CRASHEDCADAVER (D)
	cad44	INCEST (D)

Table 6. Goodness-of fit indieces for each domain.

Model	χ^2	*df*	χ^2/df	$\Delta\chi^2$ (*df*)	CFI	ΔCFI	RMSEA	ΔRMSEA	SRMR
Community									
1-factor	289.949	77	3.766	Ref	0.902	Ref	0.103	Ref	0.0488
Perceled model	0.000	0	0.000	289.949 (77)	1.000	+0.098	0.000	+0.100	0.0000
Autonomy									
1-factor	144.046	27	5.345	Ref	0.906	Ref	0.129	Ref	0.0727
Parceled model	0.000	0	0.000	144.046 (27)	1.000	+0.094	0.000	+0.129	0.0000
Divinity									
1-factor	780.207	119	6.556	Ref	0.802	Ref	0.146	Ref	0.0739
Parceled model	0.000	0	0.000	780.207 (119)	1.000	+0.198	0.000	+0.146	0.0000

Note: CFI, Comparative Fit Index; ΔCFI, difference of comparative fit index; RMSEA, root mean square of error approximation; ΔRMSEA, difference of root mean square of error approximation.

4. Discussion

In this report, we used the CAD Scale among a Japanese parent population to show a perfect fit to the data in parcelled 1-factor models of the C, A, and D domains. The three types of moral violations (community, autonomy, and divinity violations) were identified among the Japanese parent population. As in Rozin et al. (1999)'s hypothesis, Japanese parents demonstrated a very similar structure of moral codes. In the CAD scale, each of the C, A, and D domains proved to be a single-factor structure. Moral codes consist of Community, Autonomy, and Divinity among the Japanese parent population. These results are in line with the big three ethics in the moral of Shweder et al. (1990). Although the importance or degree of involution of each three ethics differs across cultures, the big three ethics are widespread (Haidt, 2003; Jensen, 1997; Jensen, 2008). For example, Song et al. (2022) showed that there is a moderate correlation between the three bases defined in terms of the three moral codes and the three moral emotions based on CAD hypothesis among Chinese. Thus, the big three moral ethics are likely to be proven across different cultures.

There were, however, a few items that did not correspond to the domain being derived from Rozin et al.'s hypotheses. Thus, among the C domain items, item 8 "A PERSON is seeing and hearing an employee unjustifiably complain to his/her boss" and item 10 "A PERSON is seeing someone attempt to cut into a long line" showed the highest correlation with the A domain. The diffusion boundary between self and other construals in close relationships seems to be characteristic in Japanese culture (Markus & Kitayama, 1991; Rothbaum et al., 2002; Triandis, 1989). When they imagine a moral violation occurring in a close relationship, Japanese people are likely to feel as if that is their own experience. When they feel that both community and autonomy are equally violated, they may feel contempt and anger simultaneously. When exposed to situations that Rozin et al.

(1999) defined as community violations, Japanese also show an anger response (in order to protect community norms). Those complicated emotions may be noticed as feelings of displeasure.

Among the A domain items, item 15 "A PERSON is looking at a picture of the inmates at a World War II concentration camp being led into the gas chamber by the Nazis" and item 22 "A PERSON is being told about an acquaintance who embezzled from a bank" showed the highest correlation with the D domain. Although item 15 assumed violations of autonomy in the CAD hypothesis, the description of holocaust may make them feel a violation of divinity because it may remind them of the sinfulness of war in the current Japanese mind. Item 22 also assumed a violation of autonomy. Since money is one of the most valuable assets, the behaviour of someone who embezzles may elicit feelings of a dirty shame as well as harm from Japanese perspectives. They may feel impurity or degradation to himself/herself, or to others. Therefore, they might feel it is a violation of divinity in this situation.

Among the D domain items, item 41 "A PERSON is eating something extremely sour" showed the highest correlation with the C domain in the Japanese parents. According to Rozin et al.'s (1999) hypothesis, this item describes the situation of divinity or purity violations. Divinity morals help to avoid sin and spiritual pollution in matters related to sexuality, food, and religious law more generally (Haidt & Graham, 2007). Item 41 starts with "A person…" where the subject of the act is another person rather than the observer himself/herself. Japanese people are interdependent and have experienced a considerable degree of connectedness with others (Kitayama, 2002; Kitayama et al., 2009). Therefore, situations when someone feels displeasure may be close to the situations of violations of community for Japanese. However, as Cameron et al. (2015) pointed out, one may have felt mixed emotions in a specific situation. In addition, the salience of divinity as a moral matter is low in Japanese culture (Rozin et al., 1999) and feelings of displeasure such as disgust as a moral emotion may be observed with low intensity, in terms of the CAD triad hypothesis. Hence, the divinity domain may be a vague construct. Also, there are a large number of items for the domain of violations of divinity. In general, for statistical reasons, a scale that consists of numerous items is likely to show an insufficient level of goodness-of-fit to the data (Kenny & McCoach, 2003). Therefore, the domain of violation of divinity showed an insufficient level of a goodness-of-fit index.

Our study has several limitations. First, participants were not asked about the intensity of different emotions (contempt, anger, and disgust) separately but simply asked about feelings of displeasure for each item. Since human emotions are complex, several emotions could arise simultaneously in a situation when someone noticed a violation of moral ethics. One-to-one ties between moral violation content and emotion may consider one-to-one ties between the intensity of a single emotion among several emotions and a single moral violation domain. For example, an experimental study showed that the manipulation of taboo (cultural norms) violation affected disgust and avoidance but not anger

(Gutierrez & Giner-Sorolla, 2007). Measuring the degree of contempt, anger and disgust separately might be likely to distinguish complex moral emotions. However, one-to-one ties between moral violation content and emotions were not identified in this study. We intentionally avoided the lexical influences tied to specific moral emotion words. Of course, additional studies are needed to identify them. Second, the age of the participants in this study was relatively restricted. Studies using populations with different age ranges may produce different results. Third, our study did not examine recognition of facial expressions related to moral emotions that are an important element of moral emotion studies. Psychometrically, our sample size was not sufficiently large, measurement invariance and equivalence were not examined in this study. Further studies across cultures are needed for comparisons of cultural differences. Another drawback of our research is that we did not assess the effects of religiosity of the participants on the degree of CAD scores. Most of the Japanese people report that they have no particular religion, atheist. And yet many of them, while having a family temple, go to a Shinto shrine when they have a newborn, go to a Christian church when they have a wedding, and go to a Buddhist temple when they have a funeral. This is not necessarily linked to low spirituality (Kijima et al., 2000). However, unique "hybrid" of religiosity (acceptance of dissents) of the Japanese culture may influence their notion of divinity and disgust. Further studies are needed. Associations between individuals, societies, and religions in terms of CAD theory may be worth examining from psychological perspectives.

Despite these drawbacks, our results support the CAD hypothesis and indicate the root of the concept of morality in a Japanese parent population. These results did not differ substantially from those of Rozin et al.'s (1999) study. Additional tasks for future studies are to shed light on the construct of moral emotions and moral ethics.

5. Conclusion

The three types of moral violations (community, autonomy, and divinity violations) were identified among the Japanese parent population. Our results support the CAD hypothesis and indicate the root of the concept of morality in a Japanese parent population. However, one-to-one ties between moral violation content and emotions were not identified in this study. Further studies are needed. Comparisons of cultural differences and associations between individuals, societies, and religions in terms of CAD theory may be worth examining from psychological perspectives.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

Ethics Approval

This Study has been approved by the Institutional Review Board (IRB) of the Kitamura Institute of Mental Health Tokyo (No. 2021101401). All participants gave written informed consent after understanding the study's rationale and procedure. The authors assert that all procedures contributing to this study comply with the ethical standards of the National and Institutional Committees on Human Experimentation and with the Helsinki Declaration of 1975 as revised in 2008.

Data Availability Statement

All the data used in this study are available upon reasonable request to the senior author.

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Appendix 1

Table A1. Summary of all the CAD questionnaire items.

item No.		Contents abbreviation	Domain by the CAD hypothesis	Domain by the highest correlation	Parcel allocation
Japanese version	English version				
1	46	WATCHDOGPOOP	D	D	D1
2	45	BUMPINTO	A	A	A3
3	44	INSURANCE	A	A	A1
4	43	SCOLDHIT	A	A	A2
5	35	NONSMOKER	A	A	A2
6	41	STEALBEG	A	A	A1
7	40	BIGOT	A	A	A2
8	**34**	**COMPLAIN**	**C**	**A**	**Delete**
9	38	FUNERAL	C	C	C1
10	**37**	**JUMPQUEUE**	**C**	**A**	**Delete**
11	36	CYNIDE	A	A	A3
12	-	-	-	-	-
13	39	DANDRUFF	D	D	D2
14	33	SALESMAN	C	C	C1
15	**32**	**WWIICONC**	**A**	**D**	**Delete**
16	31	APPLWORM	D	D	D3
17	30	OTHERCOCKROACH	D	D	D3
18	29	BITTER	D	D	D2
19	28	EMPSCPLD	C	C	C2
20	27	TEENEAT	C	C	C3
21	26	CORPSE	D	D	D3
22	**25**	**EMBEZZLE**	**A**	**D**	**Delete**
23	24	FIRSTNAME	C	C	C3
24	23	TOUCHCADAVER	D	D	D3
25	22	SEX1770	D	D	D1
26	21	CRASHEDCADAVER	D	D	D3
27	20	MURDERERSSWEATER	D	D	D2
28	19	TRAIN	C	C	C1
29	18	WATCHSTOOL	D	D	D2
30	17	CUTWRIST	D	D	D1

Continued

31	16	LINE	A	A	A1
32	15	OWNCOCKROACH	D	D	D1
33	14	CURSE	C	C	C3
34	13	TEACHER	C	C	C2
35	12	BEATWIFE	A	A	A3
36	11	CLEANER	C	C	C2
37	10	CRITBOSS	C	C	C1
38	9	REDLIGHT	C	C	C2
39	8	BUSSEAT	C	C	C1
40	7	STEPONPOOP	D	D	D2
41	**6**	**SOUR**	**D**	**C**	**Delete**
42	5	ROTTENEGG	D	D	D1
43	4	FLAG	C	C	C2
44	3	INCEST	D	D	D3
45	2	ROTMEAT	D	D	D3
46	1	PSEUDOLOGIA	C	C	C1

Note. Item 8, 10, 15, 22, and 41 were deleted in the series of confirmatory factor analyses.

Appendix 2

Descriptions for the three ethics form Rozin et al. (1999);

1) [*The ethics of Autonomy*] *Individual freedom/rights violations. In these cases an action is wrong because it directly hurts another person, or infringes upon his/her rights or freedoms as an individual. To decide if an action is wrong, you think about things like harm, rights, justice, freedom, fairness, individualism, and the importance of individual choice and liberty.*

2) [*The ethics of Community*] *Community/hierarchy violations. In these cases an action is wrong because a person fails to carry out his or her duties within a community, or to the social hierarchy within the community. To decide if an action is wrong, you think about things like duty, role-obligation, respect for authority, loyalty, group honor, interdependence, and the preservation of the community.*

3) [*The ethics of Divinity*] *Divinity/purity violations. In these cases a person disrespects the sacredness of God, or causes impurity or degradation to himself/herself, or to others. To decide if an action is wrong, you think about things like sin, the natural order of things, sanctity, and the protection of the soul or the world from degradation and spiritual defilement.*