

Clara L. Goossens
Editor

FAMILY LIFE

Roles, Bonds and Impact

Family Issues in the 21st Century

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FAMILY ISSUES IN THE 21ST CENTURY

**FAMILY LIFE: ROLES, BONDS
AND IMPACT**

CLARA L. GOOSSENS
EDITOR



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Chapter 6

**THE EFFECTS OF PERCEIVED CHILDHOOD REARING
ON SUBSTANCE AND BEHAVIOUR ADDICTION AMONG
JAPANESE UNIVERSITY STUDENTS:
MEDIATION THROUGH PERSONALITY TRAITS**

*Junko Watanabe¹, Xi Lu¹, Qingbo Liu¹, Masayo Uji¹,
Masahiro Shono², Zi Chen³, and Toshinori Kitamura^{1,*}*

¹Department of Clinical Behavioural Sciences (Psychological Medicine),
Graduate School of Medical Sciences, Kumamoto University, Kumamoto, Japan

²Yuge Hospital, Kumamoto, Japan

³Research Center of Applied Psychology, Cheng Don Medical College,
Cheng Don, China

ABSTRACT

Early life environment and personality are two of the correlates of substance and behavioural addictions studied in many investigations, but these have infrequently been studied in the same population. The Parental Bonding Instrument (PBI) is a widely used instrument to measure of the perceived rearing in childhood. It has two subscales --- Care and Overprotection. Affectionless (low Care) control (Overprotection) has been reported as a risk factor of a variety of psychopathology. Using a group of 3802 Japanese university students under 26 years old, we studied the association of perceived rearing (PBI) and personality (Temperament and Character Inventory) with substance abuse (smoking frequency, alcohol consumption) and behavioural addiction (early sexual debut). A structural equation model showed that both men and women with tendencies towards the three types of addiction were characterised by high Novelty Seeking and Reward Dependence as well as low Self-directedness (SD), Harm Avoidance and Persistence. Parental affectionless control influenced addictive tendencies both directly

* Corresponding author. Tel: +81 96 373 5181; fax: +81 96 373 5181. E-mail address: kitamura@kumamoto-u.ac.jp

and through low SD. Thus, immaturity of personality mediates the effects of poor early environment on the development of addictive tendency.

INTRODUCTION

While addiction has been viewed within the medical field in relation to substance abuse, this view has recently been criticized as too restrictive. Historically the term addiction has referred to the attraction to and power and danger of a host of things, from substances to behaviours, foods to fashions (Neve, 2005). Orford (1985, 2001) proposed the excessive appetite model of addiction. Under this rubric he included excessive drinking, smoking, gambling, eating, sex, and a diverse range of drugs. Similarly, Christo, Jones, Haylett et al. (2003) included a number of what they termed addictive behaviours in their self-report Shorter PROMIS Questionnaire, including nicotine, recreational drugs, prescription drugs, gambling, sex, caffeine, food binging, food starving, exercise, shopping, work, interpersonal relationships, and compulsive helping. Thus, an individual may be addicted to a variety of behaviours that can function both to produce pleasure and to provide escape from internal discomfort. Addiction is thus characterized by recurrent failure to control the behaviours and continuation of these behaviours despite significant negative consequences (Dittmar, 2005; Goodman, 1990). Addictions to both substances and behaviours are likely to coexist (Greenberg, Lewis, & Dodd, 1999; Lau, Tsui, & Lam, 2007; Martinotti, et al., 2008; O'Hara, 2005).

In adolescent and young adult populations, smoking, drinking, and risky sexual behaviour are health concerns in Japan. Smoking has been increasingly prevalent among young Japanese women; in those aged 20 to 29, the smoking rate was 9% in 1989 and 18% in 2006 (Ministry of Health, Labour, and Welfare, 2009). Among a community population with a mean age of 21, more than 90% of women were found to have begun drinking regularly before the age of 20 despite the fact that drinking prior to this age is illegal in Japan (Nakazawa, Kitamura, Nomura, Iwata, & Tomoda, 1994). Increasing opportunities to obtain alcoholic drinks as well as less social pressure on women to remain abstinent may result in more women developing alcoholism in Japan in the future. Recently Japanese adolescents have become more sexually active. While the total number of abortions in Japan has decreased over the last decade, the proportion of teen abortions has increased, accounting for about 45,000 abortions a year. Thus, smoking, drinking, and early sex are currently serious health issues. Taking into account the above-mentioned expansion of the concept of addiction, it may be of both theoretical and clinical importance to consider these three types of health issues as a unitary category. Hence, the first research question of this paper was: Do substance (nicotine and alcohol) and behaviour (early sexual debut) addictions consist of a single concept among Japanese university student sample?

The aetiology of addiction has been studied from a wide variety of perspectives. Several factors have been proposed as correlates of addiction, with childhood environment being one such factor. For example, child abuse history has been reported more frequently by people who smoke more (Danese, Pariante, Caspi, Taylor, & Poulton, 2007). Early commencement of smoking is also associated with witnessing domestic violence, household substance abuse, having a mentally ill or incarcerated household member, and parental separation or divorce

(Anda, et al., 1999). Women with a childhood sexual abuse history have a substantially increased risk of developing a wide range of psychopathology, notably alcohol abuse (Kendler, Bulink, Silberg, Hettema, Myers, & Prescott, 2000). Although little empirical research has been published investigating the aetiology of sexual addiction, researchers are concerned about the contributing role of childhood sexual abuse (Gold, & Heffner, 1998). Contrary to the abundance of research on the association between child abuse history and addiction, there have been few studies on the association of perceived parental rearing with smoking, problem drinking, or early sexual activity, although the association between perceived rearing and a variety of psychopathology has been widely studied (e.g. Parker, 1979, 1983; Plantes, Prusoff, Brennan, & Parker, 1988; Rey, 1995; Sato, et al., 1997, 1998; Sato, Sakado, Uehara, Nishikawa, & Kasahara, 1997; Uehara, Sato, Sakado, & Someya, 1998; Zweig, & Paris, 1991). Nevertheless, because perceived rearing is experienced throughout childhood and adolescence, it may substantially influence the onset and maintenance of addiction. Thus, the second research question of our study was: How is perceived rearing associated with substance and behaviour addictions in a Japanese university student sample?

Another potential factor that correlates with addiction is personality. Cloninger (1987a) and Cloninger, Svrakic, and Przybeck (1993) noted that personality is divided into temperament, which is derived mainly from genetic factors, and character, which develops as individuals interact with their social environment. The personality is viewed as an inseparable composite of parts that have nature and nurture origins. Here temperament is the basis of behavioural patterns, while character reflects personality maturation that is itself based on temperament. Cloninger, Svrakic, and Przybeck (1993) claimed that temperament and character consist of several dimensions. For temperament these include Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD), and Persistence (P), although P was extracted as an independent factor from RD. There have been many investigations reporting links between temperament and biological factors (Benjamin, Li, Patterson, Greenberg, Murphy, & Hamer, 1996; Curtin, Walker, Peyrin, Soulier, Badan, & Shulz, 1997; Demitrack, Gold, Dale, Krahn, Kling, & Straus, 1992; Ebstein, et al., 1996; Ebstein, Segman, Benjamin, Osher, Nemanov, & Belmaker, 1997; Garvey, Noyes, Cook, & Blum, 1996; Katsuragi, et al., 1999; Stein, Hollander, & Liebowitz, 1993). Character includes three dimensions: Self-directedness (SD), Cooperativeness (CO), and Self-transcendence (ST). Are some temperament and character patterns associated with addictions to substance (nicotine and alcohol) or behaviour (early sexual debut) among Japanese university students? Before addressing this question directly we will briefly review the literature on the association between personality and addictions.

There have been some studies that suggested association between tobacco use and extraversion (Arai, Hosokawa, Fukao, Izumi, & Hisamichi, 1997), neuroticism (Terracciano, Costa, 2004), or NS (Dinn, Aycicegi, & Harris, 2004; Downey, Pomerleau, & Pomeleau, 1996; Gurpegui, Jurado, Luna, Fernández-Molina, Moreno-Abril, & Gálvez, 2007; Krebs, Weyers, & Janke, 1998; Laucht, Becker, El-Faddagh, Hohm, & Schmidt, 2005; Pomerleau, Downey, Stelson, & Pomerleau, 1995; Pomerleau, Pomerleau, Flessland, & Basson, 1992).

Cloninger and colleagues (Cloninger, 1987b; Cloninger, Bohman, & Sigvardsson, 1981; Cloninger, Christiansen, Reich, & Gettesman, 1978; Cloninger, Sigvardsson, & Bohman, 1988) proposed two subtypes of alcoholism, type 1 and type 2. Type 1 alcoholism (milieu-limited) is more prevalent, occurs in both sexes, and requires both genetic and environmental

factors (heavy recreational drinking). The onset of type 1 alcoholism is in middle ages. Type 2 alcoholism is less prevalent, occurs in males only, and requires only a genetic background. It occurs early in life. Cloninger (1987) hypothesised that type 1 alcoholism would be characterised by low NS, high HA, and high RD, in contrast with the high NS, low HA, and low RD of type 2 alcoholism (Cloninger, 1987). A few studies using inpatient subjects have since been carried out to test this hypothesis (e.g., Cannon, Clark, Leeka, & Keefe, 1993; Yoshino, Kato, Takeuchi, Ono, & Kitamura, 1994). However, few studies have examined a community population. Furthermore, the association of character dimensions with problem drinking or alcoholism have been only minimally studied.

The personality-related aspects of unsafe sexual behaviour have been examined in psychology studies. People prone to sensation seeking (Zuckerman, Bone, Neary, Mangelsdorff, & Brustman, 1972) were shown to be more likely to participate in unsafe sex (Chandra, et al., 2003; Kalichman, Cain, Zweben, & Swain, 2003; Kalichman, Hechman, & Kelly, 1996; Zuckerman, 1994). They had a greater number of sexual partners and engaged more frequently in sexual activities than did persons less inclined to sensation seeking (Zuckerman et al. 1972; Zuckerman, Tushup, & Finner, 1976). Impulsivity has also been reported as a correlate of risky sexual behaviour (Lejuez, Simmons, Aclin, Daughters, & Dvir, 2004). Akin to sensation seeking and impulsivity are NS. NS was correlated with risk taking behavior (Laviola, Macri, Fletcher, & Adriani, 2003). Thus, we expected that early sexual activity would be associated with high NS.

The above findings all suggest that the three types of addiction we are interested in are associated with high NS. Thus we were interested in how and which personality traits are associated with substance and behaviour addictions among a Japanese university student sample.

Studies have shown that personality traits are linked to perceived rearing (e.g., Kitamura, & Kishida, 2005; Ono, et al., 1999). In the framework of Cloninger's seven-factor model, SD was associated with parents' affectionless control of their children (Kitamura, Tomoda, Kijima, Sakamoto, Tanaka, & Iwata, 2002). Thus far, however, little research has been done as to the effects of perceived rearing and personality on the development of addictive tendency simultaneously. In this study we assumed that perceived parental rearing would influence character domain characteristics that would in turn influence addictive tendency. In addition, it might be that perceived rearing would directly influence the development of addictive tendency.

To recapitulate the research questions posed in this study:

- (1) Do substance (nicotine and alcohol) and behaviour (early sexual debut) addictions consist of a single concept?
- (2) How is perceived childrearing associated with substance and behavioural addictions?
- (3) Which personality traits are associated with substance and behavioural addictions, and in what ways?
- (4) Does perceived rearing influence character traits (that in turn influence susceptibility to addiction)?

METHODS

Participants

Study participants were drawn from a pool of Japanese adolescents and young adults who participated in a questionnaire survey on sexual and contraceptive behaviours. Details are available elsewhere (Matsuoka, et al., 2006). Briefly, we contacted 615 universities in Japan, of which 110 (18%) participated in the study. These 110 universities were responsible for 33,779 eligible students. Each university was allowed to use its discretion in determining how questionnaires should be distributed and how many students should be approached so as to best minimize possible selection bias. Questionnaires were filled out and anonymously returned to us directly by mail. A total of 4,357 questionnaires were returned (13% of eligible students). Because our main interest was addiction (smoking, drinking, and early sex) of adolescents and young adults, we excluded respondents who were married or older than 25 years, or if they did not fill in the items examined in this study. This resulted in 3,802 (87%) individuals, comprised of 1,109 (29%) men and 2,693 women. Their mean age (standard deviation, SD) was 20.2 (SD = 1.5) years old. Men (mean = 20.2, SD = 1.7) were significantly ($t = 2.8, p < .01$) but very slightly older than women (mean = 20.1, SD = 1.4).

Measurements

Addictive Behaviours

We assessed (1) smoking, (2) alcohol consumption, and (3) early sexual debut as indicators of addiction. *Smoking* was rated as the number of cigarettes smoked when the participant smoked the most. *Alcohol consumption* was rated as the days per week the participant drank when drinking the most, using a 6-point scale: never drank – 1; less than once a month – 2; once to three times a month – 3; once or twice a week – 4; three to four times a week – 5; almost everyday – 6. The *early sexual debut* was determined using the age of first sexual intercourse. Early sexual debut is associated with risky sexual behaviours such as multiple and unspecified sexual partners (Chen, et al., 2007).

Perceived Rearing during Childhood

The Parental Bonding Instrument (PBI; Parker, Tupling, Brown, 1979) is a self-report measure of the subject's perceived rearing before they were 16 years of age. The PBI has 25 items with a 4-point scale, ranging from "very unlikely" – 0 to "very likely" – 3. It consists of two subscales, Care and Overprotection. The Care score measures how affectionate the parent was towards the child. The Overprotection score measures how controlling the parent was in the child's activities and decisions. The PBI was translated into Japanese with Professor Parker's permission. The validity of the Japanese version of the PBI has been reported (Kitamura, & Suzuki, 1993). The factor structure of the Japanese version of the PBI is virtually the same as that of the original report (Uji, Tanaka, Shono, & Kitamura, 2006). The PBI has been used worldwide (Parker, 1989).

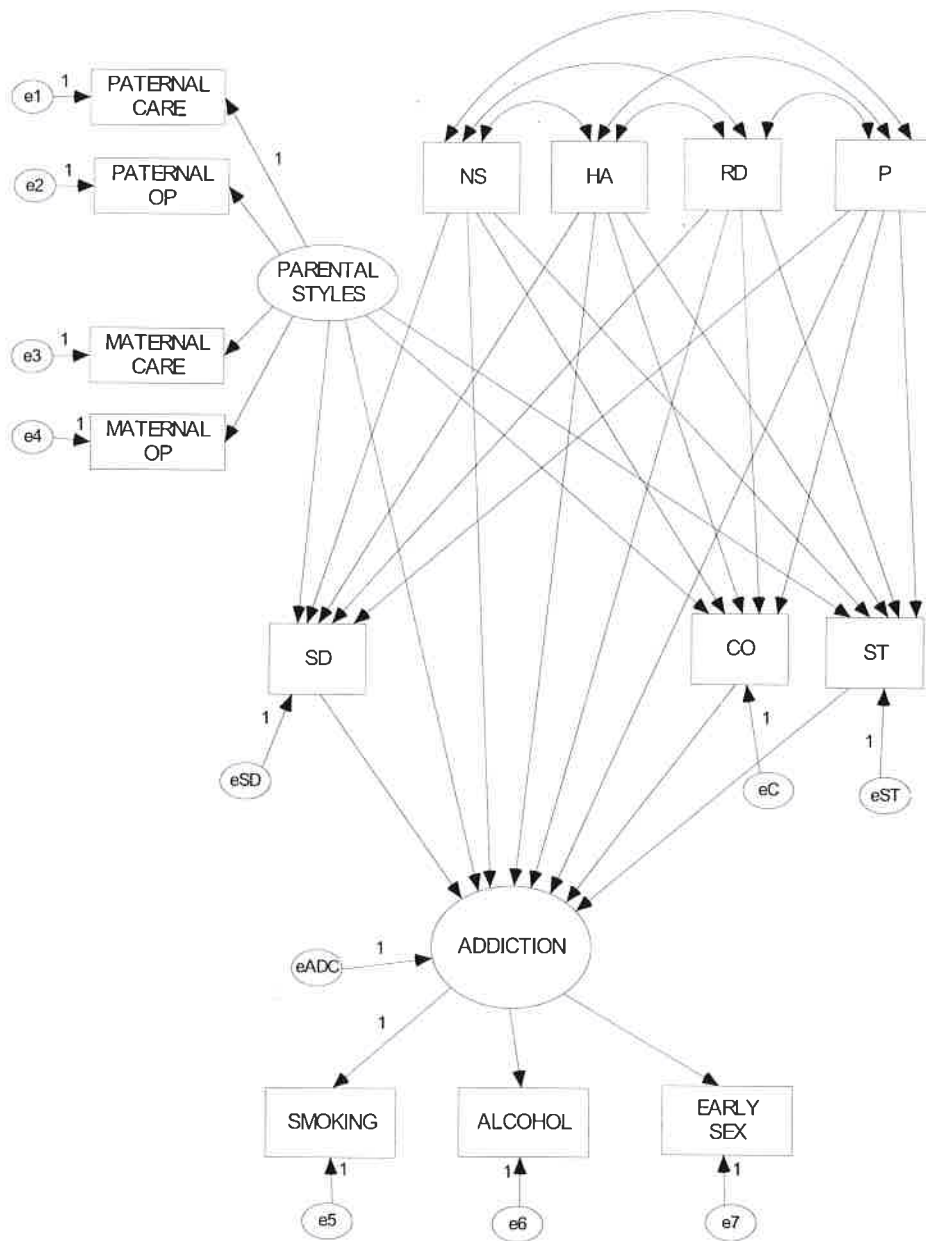
Temperament and Character Inventory

The Temperament and Character Inventory (TCI; Cloninger, Svrakic, & Przybeck, 1993) was translated into Japanese (Kijima, Tanaka, Suzuki, Higuchi, & Kitamura, 2000) with the permission of Professor Cloninger. The Japanese items were retranslated back to English by a person who was unaware of the original English in order for the original author to verify the wordings. The TCI and its predecessor, the Tridimensional Personality Questionnaire, have been widely used in Japanese patient and non-patient populations (e.g., Yoshino, Kato, Takeuchi, Ono, Kitamura, 1994; Kitamura, Kijima, Sakamoto, Tomoda, Suzuki, & Kazama, 1999). There are studies on the internal consistencies and factor structures of the Japanese versions (Takeuchi, Yoshino, Kato, Ono, & Kitamura, 1993; Kijima, et al., 2000; Tomita, Aoyama, Kitamura, Sekiguchi, Murai, & Matsuda, 2000). Because of our stringent page limitation, we restricted the items in the inventory to those with the highest item-total subscale score in our previous study. Thus, the present study included three items each pertaining to NS, HA, RD, SD, CO, and ST, and two items involving P. The item-total score correlations in this participant population were .53 to .88 for NS, .54 to .78 for HA, .65 to .77 for RD, .78 to .83 for P, .67 to .79 for SD, .18 to .91 for CO, and .51 to .71 for ST.

Statistical Analyses

We first calculated means and SDs of all the variables used in this study, and then estimated correlations between them. Because we aimed to determine whether the three types of addictions (smoking, alcohol consumption, and early sexual debut) could consist of a single latent concept and whether perceived rearing and personality would exert influences on this concept, we created a path model to apply a structural equation model (SEM) to the data. Here we posited that (1) Smoking, Alcohol Consumption, and Early Sexual Debut would comprise a single endogenous variable --- Addiction; (2) the four PBI subcategories would consist of a single endogenous variable --- Parental styles; (3) all four temperament domain variables would influence both Addiction and the three character domain variables; (4) all three character domain variables would influence Addiction; (5) Parental styles would influence the three character domains as well as Addiction; and (6) all the temperament domain variables would share a covariance between themselves.

The original path model was modified using a modification index. Modification indexes suggest possible covariances and paths that would, if applied in the model, improve the goodness-of-fit of the model to the data. We focused on ensuring that addition of such covariances to the model was consistent with theoretical and common sense (Arbuckle, & Wothke, 1995-1999, p. 153). The fit of the model with the data was examined in terms of goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). According to conventional criteria, a good fit would be indicated by GFI > .95, AGFI > .90, CFI > .97, and RMSEA < 0.05; an acceptable fit by GFI > .90, AGFI > .85, CFI > .95, and RMSEA < 0.08 (Schermelel-Engel, Moosbrugger, & Müller, 2003). In order to improve the goodness-of-fit, modification indexes were used. Furthermore, because gender showed significant correlation with many of the variables used in this study, we carried out a multi-group analysis with men and women as two discrete subsamples. For statistical analyses, we used SPSS for Windows and AMOS.



OP, Overprotection; NS, Novelty Seeking; H, Harm Avoidance; RD, Reward Dependence; P, Persistence; SD, Self-directedness; CO, Co-operativeness; ST, Self-transcendence.

Figure 1. Original path model depicting the influences between perceived rearing, personality, and addictive behaviours.

Table 1. Means and SDs of and correlations between all variables used in this study (N = 3802)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Current age	---															
2. Gender (1, men; 2, women)	-.05**	---														
3. Smoking	.11***	-.31***	---													
4. Alcohol consumption	.22***	-.13***	.29***	---												
5. Sexual debut (age)	.39***	.07***	-.28***	-.13***	---											
6. NS	-.01	-.01	.18***	.14***	-.13***	---										
7. HA	-.06**	.10***	-.11***	-.13***	.10***	-.16***	---									
8. RD	.02	.09***	.01	.06***	-.04**	.01	.12***	---								
9. P	.03*	.01	-.09***	-.03	.05**	-.31***	-.01	.14***	---							
10. SD	.03	.11***	-.10***	-.07***	.06***	-.08***	-.06***	-.19***	-.04*	---						
11. CO	-.02	.06***	-.01	.02	-.02	-.08***	-.08***	.18***	.12***	.15***	---					
12. ST	.01	-.03	.10***	.08***	-.08***	.04*	-.18***	.15***	.13***	-.13***	.11***	---				
13. Father's Care	-.02	.10***	-.05**	-.03	-.01	-.05**	-.04*	.10***	.09***	.04*	.10***	.07***	---			
14. Father's OP	-.03	.03	.04***	.03	-.06***	.05**	.08***	.03	-.04*	-.12***	-.10***	.03	-.38***	---		
15. Mother's	-.02	.10	-.07	-.03	.02	-.04	-.01	.13	.06	.03*	.10	.03*	.44	-.27	---	

Ethics

This study was accepted by the Ethical Committee (Institutional Review Board) of the National Center of Neurology and Psychiatry, Kohnodai Campus, where the study was conducted.

RESULTS

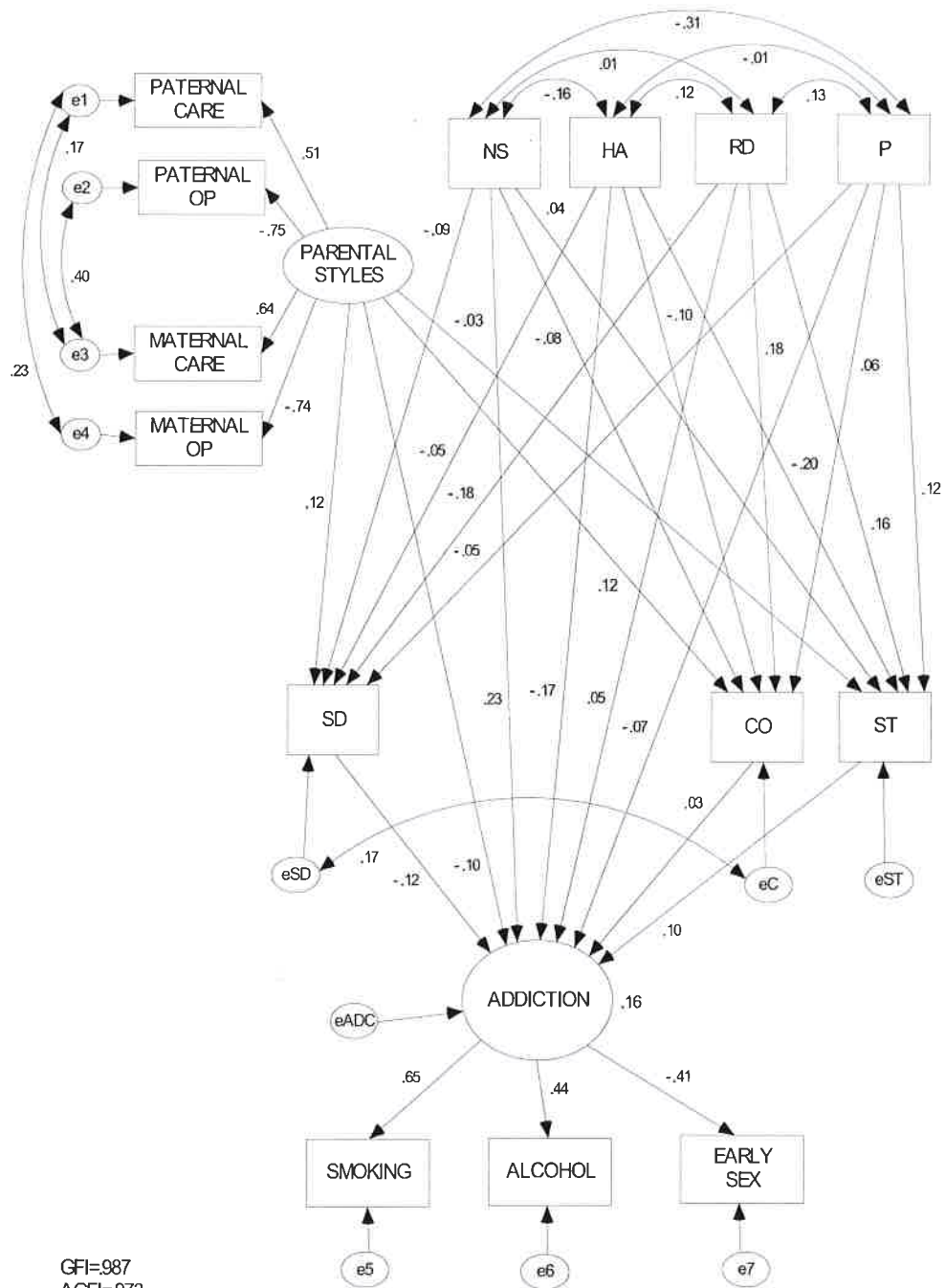
The three types of addiction were significantly correlated with each other (Table 1), suggesting a single concept underlying addiction. Age and male gender were positively correlated with the three types of addiction.

As expected, some TCI subscale scores were correlated with each other. Specifically, NS was inversely correlated with HA and P whereas HA was positively correlated with RD. RD was positively correlated with P. SD and CO were positively correlated with each other, whereas ST was inversely correlated with SD but positively with CO. SD and CO were inversely correlated with NS and HA. While SD was inversely correlated with RD and P, CO was positively correlated with RD and P. ST showed specific correlations with the temperament scores; it was correlated with NS, RD, and P, but inversely with HA. Female gender was associated with higher HA, RD, SD, and CO.

The Care and Overprotection scores of the PBI were correlated between fathers and mothers, respectively. The Care and Overprotection scores were inversely correlated with each other within each parent. Female gender was associated with higher parental Care scores.

The original path model showed an acceptable fit with the data: GFI = .961, AGFI = .926, CFI = .824, and RMSEA = 0.073. Modification indexes suggested covariances between paternal and maternal Care scores, between paternal Care and maternal Overprotection, between Maternal Care and paternal Overprotection, and between SD and CO. Correlations of PBI subscales have often been reported in the literature, and the present findings were in line with such previous investigations. However, because AMOS does not allow such a covariance *directly* between two endogenous variables, we set a covariance between these variables' error variables. These error variables reflect an element of each personality and perceived rearing construct that is not explained by the Parental Style and temperament variables. The revised path model showed a better fit with the data: GFI = .987, AGFI = .973, CFI = .953, and RMSEA = 0.039. This was regarded as a good fit. All the estimates (standardized estimates in brackets) were significant except for the path from CO to Addiction. However, Addiction was mainly influenced by low SD (-.12), high NS (.23), and low HA (-.17); SD was mainly influenced by better Parental Styles (.12) and low RD (-.18); CO was mainly influenced by better Parental Styles (.12), low HA (-.10), and high RD (.18); ST was mainly influenced by low HA (-.20), high RD (.16), and high P (.12). Thus, the effects of Parental Styles on Addiction were exerted both directly and through low SD.

In a multi-group analysis, the best fit was obtained when no restraints were posed on the estimates. This means that the men and women had different model structures, and we therefore examined these separately (figures not shown). However, despite slight differences in estimates, the structures were virtually the same between men and women.



GFI=987
 AGFI=973
 CFI=953
 RMSEA=039
 AIC=459.810

OP, Overprotection; NS, Novelty Seeking; H, Harm Avoidance; RD, Reward Dependence; P, Persistence; SD, Self-directedness; CO, Co-operativeness; ST, Self-transcendence

Figure 2. Revised path model depicting the influences between perceived rearing, personality, and addictive behaviours.

DISCUSSION

In this study, addictions to two substances (tobacco and alcohol) and one behaviour (sex) comprised a single latent variable in a young Japanese university student population. These three types of addiction showed significant correlations with each other and the SEM indicated a latent variable of Addiction. This is in line with literature showing that these types of addiction coexist (Greenberg, Lewis, & Dodd, 1999; Lau, Tsui, & Lam, 2007; Martinotti, et al., 2008). In addition to being of research interest, such a finding suggests that students prone to addiction are at greater health risk. For example, among sexually active college students, alcohol consumption was associated with an increase in unprotected vaginal sex in sexual encounters involving a non-steady partner (Brown, & Venable, 2007). In a pregnant teenage female population, early use of alcohol and use of alcohol during first coitus are risk factors for problematic alcohol use before and during pregnancy (De Genna, Larkby, & Cornelius, 2007). Therefore clinicians may need to view a client with one of the addictions with a broad perspective that takes into account the possibility of multiple addictions.

In this study, high NS and low HA were associated with Addiction. This pattern is similar to that seen in Cloninger's concept of type 2 alcoholism (Cloninger, 1987b; Cloninger, Bohman, & Sigvardsson, 1981; Cloninger, Christiansen, Reich, & Gettesman, 1978; Cloninger, Sigvardsson, & Bohman, 1988), although the present population may not have contained a great number of clinical cases of alcoholism. Such a link between alcoholism and personality pattern was reported in a Japanese clinical population (Yoshino, Kato, Takeuchi, Ono, & Kitamura, 1994). Type 2 alcoholism is characterised by the early onset of problem drinking and is more prevalent in men. In line with these characteristics, men in this study scored higher in alcohol consumption and HA. Zero-order correlations of temperament domain traits with the three types of addiction were very similar. This suggests a similar temperament pattern underlying smoking, early sexual debut, and heavy drinking, a finding that supports our hypothesis that the three types of addictions constitute a single latent construct. In the face of noxious environments, individuals high in NS may seek novel stimuli or activities that will enable them to avoid, even if temporarily, negative affects, and will enable them to feel self-esteem. The desire for these stimuli or activities may be intensified when there exist fewer or less intense inhibitory influences arising from HA. Hence, high NS coupled with low HA may lead people to addictive behaviours.

Do men and women differ with regards to the correlation between temperament and addiction? The SEM in this study suggested that there were no substantial differences between the two genders. Addiction in women was also linked to high NS and low HA. This pattern is contrary to that which characterizes type 2 alcoholism that is often seen among alcoholic middle-aged women. An alternative explanation may be that alcohol consumption is linked to *low* NS and *high* HA as in women with type 2 alcoholism, but that these associations disappear due to confounding effects of smoking or early sex that together constitute the same latent variable. This hypothesis was tested by exchanging the latent variable of Addiction with drinking, excluding smoking and early sexual debut, in the same model as Figure 2. However, drinking was again associated with high NS and low HA (figure not shown). Thus, the above hypothesis was refuted. Hence, we presume that the tendency to drink may differ between young and middle-aged women. This awaits further investigation.

A unique finding of this study is the association of addictive tendencies with low SD but not with CO. SD is representative of the autonomous self. People high in SD have the confidence to deal with different situations in accordance with their goals and values. They have high self-esteem. They feel responsibility and possess the ability to pursue their objectives. On the other hand, CO indicates the extent to which individuals understand and share the feelings of others. Therefore, the characteristics of people high in CO are social tolerance, empathy, helpfulness, and compassion. The present results suggest that addictive tendencies can be suppressed by high SD even when people are high in NS and low in HA. If so, the effects of psychotherapy on people with addiction may be mediated by enhancement of SD.

In a zero-order correlation matrix, parental affectionless control (low Care and high Overprotection) was correlated with smoking while parental Overprotection was correlated with early sexual debut. Only maternal Overprotection was correlated with alcohol consumption. Again this is in line with our assumption that the three types of addictions constitute a single latent construct. The SEM showed that the effects of parental styles on addictive tendencies were mediated through character traits. Thus, people whose parents were affectionate and less controlling were more likely to have high SD, which in turn reduced the tendency towards addictions. Educating parents regarding healthier rearing styles, for instance using Parent-Child Interaction Therapy or the Positive Parenting Program (Triple P), should be considered when planning strategies aimed at preventing addiction among children and adolescents (Thomas, & Zimmer-Gembeck, 2007).

Limitations of the present study merit comments. First, this was a cross-sectional study; hence all the findings were correlational. Although an SEM model assumes causal paths, this is rather theoretical and does not directly test hypotheses. Second, we heavily relied on self-reports as assessment tools. Statistically significant findings could reflect a systematic bias in the students' perceptions of themselves and their experiences during childhood. The correlations of addictive propensity with students' personality and early life experiences could reflect shared measurement method variance. Any conclusion is tentative and awaits further prospective follow-up studies.

Although we collected data on a fairly large number of university students nationwide, a low response rate mandates caution when interpreting the data in terms of the representativeness of the sample. Community-based studies with a large population and preferably in culturally different areas should be considered when conducting a replication study.

Another drawback of this study was the use of a short version of the TCI. Although our findings were consistent with theoretical expectations, the validity and reliability of such a short version of the instrument awaits a psychometric study.

We have hypothesized that addictive propensity can be predicted based on personality traits. This does not exclude possibility that addictive propensity results in occurrence of adverse experiences such as difficult interpersonal relationships that in turn lead less mature personality development.

We only studied personality traits in this study. Personality disorders were not identified. Epidemiological research has shown that a substantial portion of people in a community have at least one personality disorder (Bernstein, Cohen, Velez, Schwab-Stone, Siver, & Shinsato, 1993; Bland, et al., 1994; Nestadt, Romanoski, Chanal, Merchant, Folstein, Gruenberg, & McHugh, 1990; Samuels, Eaton, Bienvenu, Brown, Costa, & Nestadt, 2002; Stangler &

Printz, 1980; Zimmerman, & Coryell, 1989). This issue may deserve more extensive investigation.

Despite these drawbacks, the present study suggests that smoking, drinking, and early sexual debut comprise a single latent construct of Addiction in a Japanese university student population, and this construct may be influenced, though differentially for men and women, by personality traits and perceived childhood rearing.

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