



## Empirical Articles

# Lifestyles and Stress According to Self-Kindness and Goal Directedness Among Drivers

Estilos de vida e Stress em estafetas: o papel da autobondade e da orientação para objetivos

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## Abstract

**Aim:** Home delivery drivers are particularly likely to have unhealthy lifestyles and high stress because of their unusually strenuous work. This study identified differences in their lifestyles and stress according to self-kindness and goal directedness.

**Methods:** Participants were drivers from a western Tokyo branch of a large company that included a Japanese transportation business. A total of 407 drivers completed a questionnaire including items about self-kindness from the Self-Compassion Scale, goal directedness from the Japanese Experiential Time Perspective Scale, stress responses, and job stress; data from 362 male drivers were analyzed, mean age = 41.87 years (SD = 7.8). Participants were divided into four groups based on these scores: high self-kindness and high goal directedness (HS/HG), low self-kindness and high goal directedness (LS/HG), high self-kindness and low goal directedness (HS/LG), and low self-kindness and low goal directedness (LS/LG). Responses were compared among groups using Kruskal–Wallis test, Bonferroni's multiple-comparison test, and  $\chi^2$  test.

**Results:** Median fatigue, anxiety, and depression scores differed significantly among the four groups. More drivers with HS/HG than with LS/LG reported feeling rested because of sleeping well.

**Discussion:** Home delivery drivers with high self-kindness and high goal directedness exhibited restful sleep and lower levels of stress responses. Home delivery drivers should work on and manage both self-kindness and goal directedness, which employers should also facilitate.

**Keywords:** self-kindness, goal directedness, health behaviours, stress, home delivery drivers

## Resumo

**Introdução:** Os estafetas são particularmente vulneráveis a níveis de stress elevados e a estilos de vida pouco saudáveis, em virtude das exigências do seu trabalho. Este estudo identifica diferenças nos estilos de vida e stress, em função da autobondade e da orientação para objetivos.

**Método:** Participaram estafetas da filial de Tóquio Ocidental de uma grande Empresa Japonesa com um ramo de atividade na área do transporte. Um total de 407 profissionais completaram o questionário, incluindo itens sobre autobondade da Self-Compassion Scale, orientação para objetivos da Experiential Time Perspective Scale, resposta ao stress, e stress relacionado com o trabalho; foram analisados dados de 362 estafetas do sexo masculino (M = 41.87, SD = 7.8). Os participantes foram divididos em quatro grupos com base na pontuação obtida: elevada autobondade e elevada orientação para objetivos (EA/EO), baixa autobondade e elevada orientação para objetivos (BA/EO), elevada autobondade e baixa orientação para objetivos (EA/BO), e baixa autobondade e baixa orientação para objetivos (BA/BO). As respostas dos grupos foram comparadas utilizando o teste Kruskal–Wallis, o teste de comparação múltipla de Bonferroni e o teste  $\chi^2$ .

**Resultados:** Os resultados médios obtidos para a fadiga, a ansiedade e a depressão diferiram significativamente entre os quatro grupos. Os participantes com EA/EO reportaram sentir-se mais repousados do que os motoristas com BA/BO devido ao facto de dormirem bem.

**Discussão:** Os profissionais com elevada autobondade e elevada orientação para objetivos apresentaram um sono reparador e menores níveis nas respostas ao stress. Os estafetas devem, pois, desenvolver e exercitar a autobondade e a orientação para objetivos, os quais podem, igualmente, ser facilitados pelas entidades empregadoras.

**Palavras-Chave:** autobondade, orientação para objetivos, comportamentos saudáveis, motoristas de entregas ao domicílio

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The number of transportation workers in Japan, including professional drivers, who exhibit health examination results outside of reference values is higher than those inside them (Ministry of Health, Labour, & Welfare, 2016). This has been observed mostly after quality improvement procedures in home delivery services have been implemented in Japan. For example, customers may now select the time frame in which they would like their packages delivered, and delivery drivers are required to perform to rigid schedules, handle the packages carefully, and deal more extensively with customers, in a courteous and professional fashion. Moreover, they often have insufficient time to eat lunch and take breaks, and thus are particularly likely to follow unhealthy diets and experience stress. In addition to the effects on their health, previous studies suggested that drivers' high fatigue, sleepiness and stress are related to driving performance and to the likelihood of traffic accidents (Smith, 2016; Stutts, Wilkins, Scott, & Vaughn, 2003; Taylor & Dorn, 2006). Therefore, effective strategies to improve drivers' lifestyles and help them manage stress, to improve their health, are needed.

In attempting to engage in healthy behaviour most people focus on future benefits, such as disease prevention, improvements in quality of life, and increased survival rates. In other words, a future-oriented time perspective is required, in addition to a present-oriented perspective to practice healthy behaviours (Adams & Nettle, 2009; Gellert, Ziegelmann, Lipke, & Schwarzer, 2012; Guthrie, Lessl, Ochi, & Ward, 2013; Henry, Zacher, & Desmette, 2017; Keough, Zimbardo, & Boyd, 1999; Stahl & Patrick, 2012). Time perspective is a cognitive construct that describes the individual's perspective on the (relative) importance of the present, past, and future in their lives (Karniol & Ross, 1996; Zimbardo & Boyd, 1999). High levels of future time perspective have been associated with high levels of fruit and vegetable consumption (Gellert et al., 2012), regular physical activity (Stahl & Patrick, 2012), frequent exercise (Guthrie et al., 2013), low substance use (e.g., alcohol, tobacco, and drug use; Keough, Zimbardo, & Boyd, 1999) low body mass index (BMI; Adams & Nettle, 2009), general health, and age (Henry et al., 2017). In Japan, Shirai (1994) developed the Experiential Time Perspective Scale to assess time perspective in Japanese individuals. The scale includes two subscales (hopefulness and goal directedness) regarding future time perspective; the goal directedness subscale consists of five items pertaining to specific concepts describing future time perspective (e.g., *I have a plan of the future life in outline*), and previous research has suggested that high levels of goal directedness are associated with greater health awareness and physical activity in men, and lower levels of alcohol consumption in women (Shimpo, Nakamura, Fukkoshi, & Akamatsu, 2014).

While the relationship between future time perspective and health behaviours has become clear, some studies have recently highlighted the potential role of self-compassion in health-promoting behaviour (Dunne, Sheffield,

& Chilcot, 2018; Kelly, Zuroff, Foa, & Gilbert, 2010; Sirois, 2015; Terry, Leary, Mehta, & Henderson, 2013). Self-compassion consists of three main components: (a) self-kindness, which involves being kind and understanding to oneself, rather than harshly self-critical, when faced with pain or failure; (b) (sense of) common humanity, which involves perceiving one's experiences as part of the larger human experience rather than separating and isolating oneself; and (c) mindfulness, which involves holding painful thoughts and feelings within balanced awareness rather than over-identifying with them (Neff, 2003a; 2003b). Researchers have generally focused on the role of self-compassion in stress reduction (Chiesa & Serretti, 2009; Gu, Strauss, Bond, & Cavanagh, 2015), and mindfulness-based stress reduction, which includes increased self-compassion, has been found to reduce stress levels in people with mental and physical disorders as well as in healthy individuals (Chiesa & Serretti, 2009; Gu et al., 2015). In addition, the role of self-compassion in self-regulation has attracted attention. The results of a small-scale meta-analysis suggested that self-compassion was positively associated with health-promoting behaviour (Sirois, 2015). Furthermore, interventions that increased self-compassion have been shown to reduce smoking rates in participants with low levels of readiness to change (Kelly et al., 2010). Taken together, these studies suggest that self-compassion promotes health behaviours. However, health behaviour measures are varied and complex, and the specific health behaviours related to self-compassion remain unclear.

According to previous research, future time perspective and self-compassion are related to practicing positive health behaviour (Dunne et al., 2018; Gellert et al., 2012; Guthrie et al., 2013; Kelly et al., 2010; Keough et al., 1999; Sirois, 2015; Stahl & Patrick, 2012; Terry et al., 2013). However, these two concepts have generally been considered as separate psychological variables and have not been examined in combination. The characteristics of individuals with high levels of one, the other, or both variables, and whether those high in either of the variables practice healthy behaviours compared to those high in both or those high in neither, remain unclear. If one person has both high future time perspective and high self-compassion, it is necessary to investigate the two variables simultaneously. For example, someone with high future time perspective and low self-compassion may intend to work hard and earnestly but with no thought for his or her own health. Those who work hard have a higher risk of burnout, which is a psychological syndrome involving physical exhaustion, feelings of helplessness, and negative attitudes towards work, life, and others, as defined by Maslach and Jackson (1981). To avoid burnout, it is important to have self-compassion.

On this basis, we set the aim of this study, as follows: to identify differences in lifestyles and stress among home delivery drivers, according to self-kindness and goal directedness. We then formulated the following hypothesis: those who have both high self-compassion and high future time perspective will practice healthy behaviours and have less stress. To test this hypothesis, we categorized the participants into four groups: high self-kindness and high goal directedness (HS/HG), high self-kindness and low goal directedness (HS/LG), low self-kindness and high goal directedness (LS/HG), and low self-kindness and low goal directedness (LS/LG). In addition, we sought to determine whether factors related to lifestyle, including demographic characteristics, physical constitution (i.e. BMI), and job stress, differed among the four groups. We adopted self-kindness, since it is a core concept of self-compassion, and goal directedness as a specific concept of future time perspective.

## Method

### Participants

Participants were drivers who worked at a western Tokyo branch of a large company that includes a Japanese transportation business. They worked in the daytime delivering packages to personal and corporate customers. Of the 447 potential participants, 407 drivers completed the questionnaire (91.05%). Of these, 24 were excluded from the analysis because they did not provide data from their physical check-up and nine were excluded because they did not provide information regarding self-kindness or goal directedness. Moreover, men and women should be analysed separately, because lifestyles related to future time perspective differ according to gender (Shimpo et al., 2014). However, only 12 women (compared to 362 men) completed the questionnaire, and so their data were excluded from the analysis. Ultimately, data for 362 male drivers (88.94%) were analysed. Participants' mean age ( $n = 362$ ) was 41.87 ( $SD = 7.80$ ). In addition, 95 (26.24%) participants were unmarried and 267 (73.76%) were married. Their educational levels were as follows: college or university,  $n = 61$  (16.85%); junior college or technical school,  $n = 72$  (19.89%); and high school or lower:  $n = 229$  (63.26%). Participants' mean BMI was 22.05 ( $SD = 2.75$ ) kg/m<sup>2</sup>.

### Measures

#### Self-Kindness

Self-kindness was assessed using a five-item subscale (e.g., *When I experience pain, I am kind to myself*) of the Japanese version of the Self-Compassion Scale (Arimitsu, 2014; Neff, 2003b). Participants' responses used a Likert-type scale ranging from 1 (*very rarely*) to 5 (*almost always*) (Min: 5, Max: 25); higher scores indicated higher levels of self-kindness. In a previous study (Arimitsu, 2014), the mean self-kindness score was 2.77 ( $SD = .80$ ) out of 5. Arimitsu (2014) reported that the Japanese version self-kindness subscale Cronbach's  $\alpha$  was .82. In this study, the Cronbach's  $\alpha$  for self-kindness was .70.

#### Goal Directedness

Goal directedness was assessed using a five-item subscale (e.g., *I have a plan for the future*) of the Japanese Experiential Time Perspective Scale (Shirai, 1994). Participants' responses used a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) (Min: 5, Max: 25); higher scores indicated higher levels of goal directedness. In a previous study (Shimpo et al., 2014), the median goal directedness score was 15; the Cronbach's  $\alpha$  for goal directedness was .80. In this study, the Cronbach's  $\alpha$  for goal directedness was .75.

#### Stress Responses

Stress responses were assessed using the Symptoms and Disorders Related to Stress scale developed by the Japanese National Institute of Occupational Safety and Health (2010). The questionnaire consists of the following three subscales: fatigue, anxiety, and depression. Each subscale contains three items and participants are asked to rate the frequency with which they have experienced certain events during the preceding month. Participants' responses are provided using a four-point Likert type scale, ranging from 1 (*very rarely*) to 4 (*almost always*) (Min: 3, Max: 12). Respondents with a fatigue score of 12 points, an anxiety score of at least 11 points, or a depression score of at least 10 points were considered to have high levels of stress. In this study, the Cronbach's  $\alpha$ s for fatigue, anxiety, and depression were .82, .81, and .82, respectively.

## Job Stress

The 17-item Brief Job Stress Questionnaire, developed in a study commissioned by the Japanese Ministry of Health, Labour, and Welfare (2015), was used to assess job stress. Items were divided between the following nine domains (with mean scores ( $M$ ) and  $SD$ ) of male in a nationwide survey in Japan): quantitative overload ( $M = 8.7$ ;  $SD = 2.1$ ), qualitative overload ( $M = 8.6$ ;  $SD = 1.8$ ), physical demands ( $M = 2.0$ ;  $SD = .9$ ), interpersonal relationship ( $M = 6.3$ ;  $SD = 1.8$ ), workplace environment ( $M = 2.3$ ;  $SD = 1.0$ ), job control ( $M = 7.9$ ;  $SD = 1.9$ ), skill discretion ( $M = 3.0$ ;  $SD = .8$ ), job fitness ( $M = 2.8$ ;  $SD = .8$ ), and job reward ( $M = 2.8$ ;  $SD = .8$ ). Responses for each item are provided on a four-point Likert type scale ranging from 1 (*disagree*) to 4 (*agree*); lower scores for job control, skill discretion, job fitness, and job reward, and higher scores for the remaining items indicate greater stress-related burden. The minimum score for quantitative overload, qualitative overload, interpersonal relationship, and job control is 3 and the maximum score 12. In this study, the Cronbach's  $\alpha$ s for quantitative overload, qualitative overload, interpersonal relationship, and job control were .65, .63, .71, and .71 respectively. The minimum score for physical demand, workplace environment, skill discretion, job fitness, and job reward is 1 and the maximum score 4.

## Lifestyle and Physical Constitution Questionnaire at Annual Health Check-up

This questionnaire, based on one developed by the Ministry of Health, Labour, and Welfare (2013), was completed by participants at their annual health check-up. The questionnaire included items pertaining to lifestyle, such as eating habits (e.g., skipping breakfast at least 3 times per week, eating rapidly), exercise habits (e.g., moderate exercise: *Do you walk for at least 1 hour every day or have equivalent physical activities in your daily life?* and physical activity: *Have you exercised for at least 30 min at least twice per week, at an intensity that causes a slight sweat, for at least 1 year?*), current smoking and drinking habits, and rest-based sleep (*Do you feel refreshed after a night's sleep?*); respondents answered on a dichotomous scale: "yes" or "no". Participants' height and weight measured at their annual company health check-up were used to calculate BMI ( $\text{kg}/\text{m}^2$ ).

## Employee Information

All employee information (age, sex, educational level, marital status, and type of job (clerical staff or driver) was identified with reference to the employee numbers written on the envelopes.

## Procedures

In June 2016, self-administered questionnaires were sent to 447 drivers in envelopes addressed to their individual employee numbers. The contents in the envelopes explained the objective of this study and the drivers were told that they could refuse to participate and that completion and return of the questionnaire constituted agreement to participate. In order to protect their personal information, the completed questionnaires were collected from regional centers and sent to a health and safety controller at the same branch of the company. The health and safety controller gathered employee information for 2015 and the results of the annual health check-up conducted in February 2016 using the employee numbers on the envelopes, excluding personally identifiable information. Original personal numbers were created specifically for this study to refer to individual data. The questionnaires and employee information were then sent to the researchers. This study was designed using the cross-sectional method and was approved by the Ethics Committee of Ochanomizu University (accepted June 2, accepted number: 2016-4).

## Data Analysis

High and low self-kindness/goal directedness were based on median scores (15 for both). Self-kindness and goal directedness did not have cut points or thresholds to distinguish high from low. In the previous study, participants were divided into two groups using median scores of goal directedness (Shimpo et al., 2014); this study followed the previous study in that regard. We performed non-parametric analysis because these samples were not normally distributed, as shown by the Shapiro–Wilk test. Participants were divided into HS/HG, LS/HG, HS/LG, and LS/LG groups using these scores, and demographic characteristics, BMI, stress responses, job stress, and lifestyle were compared between groups using Kruskal–Wallis test, Bonferroni’s multiple-comparison test, and the  $\chi^2$  test, with significance set at a  $p$  value of  $< .05$ . All analyses were performed using SPSS version 19.0 for Windows (IBM Japan, Ltd., Tokyo, Japan).

## Results

### Classification Based on Self-Kindness and Goal Directedness

The median self-kindness and goal directedness scores were both 15 (25<sup>th</sup> percentile, 75<sup>th</sup> percentile self-kindness, 14, 17; goal directedness, 13, 17). Using these medians, 144 participants exhibited high self-kindness, 218 low self-kindness, 135 high goal directedness, and 227 low goal directedness; they were further divided accordingly (Table 1).

Table 1

*Classification Based on Self-Kindness and Goal Directedness*

Group	High self-kindness <sup>a</sup>		Low self-kindness <sup>b</sup>	
	<i>n</i>	%	<i>n</i>	%
High goal directedness ( <i>n</i> = 135)	64	17.68	71	19.61
Low goal directedness ( <i>n</i> = 227)	80	22.10	147	40.61

Note. <sup>a</sup>*n* = 144. <sup>b</sup>*n* = 218

### Comparison of Demographic Characteristics and Physical Constitution Among the Four Groups

Table 2 shows the demographic characteristics and physical constitution data for the four groups. Age, BMI, marital status, and educational level did not differ significantly among groups. Median age scores and BMI scores in the four groups were as presented in Table 2.

### Comparison of Stress Responses and Job Stress Among the Four Groups

Table 3 shows the stress responses and job stress for the four groups. Comparison of these scores showed that median fatigue, anxiety and depression scores differed significantly among groups. Median fatigue score in the HS/HG group was 6 (5, 8) score, which was lower than that for HS/LG (8 (6, 9) score), while median anxiety and depression scores in the HS/HG group were 6 (4, 7) score and 5 (3, 7) score, which were lower than in the LS/LG (7 (4, 9) score and 6 (5, 8) score). Median job fitness and job reward scores also differed significantly

Table 2

Comparison of Demographic Characteristics and Physical Constitution Among the Four Groups

Variable	HS/HG <i>n</i> = 64	LS/HG <i>n</i> = 71	HS/LG <i>n</i> = 80	LS/LG <i>n</i> = 147	<i>p</i>
Age <sup>a</sup>	40 (33, 45)	43 (37, 39)	43 (38, 46)	43 (36, 48)	.120
BMI <sup>a</sup>	22.16 (20.50, 23.81)	21.34 (20.13, 23.05)	21.69 (20.20, 24.07)	21.94 (19.93, 23.36)	.550
Marital status <sup>b</sup>					.442
Not married	18 (28.13)	15 (21.13)	18 (22.50)	44 (29.93)	
Married	46 (71.88)	56 (78.87)	62 (77.50)	103 (70.07)	
Educational level <sup>b</sup>					.250
High school or lower	38 (59.38)	43 (60.56)	48 (60.00)	100 (68.03)	
Junior college/technical	12 (18.75)	13 (18.31)	15 (18.75)	32 (21.77)	
College	14 (21.88)	15 (21.13)	17 (21.25)	15 (10.20)	

Note. HS/HG = High self-kindness, high goal directedness, LS/HG = Low self-kindness, high goal directedness, HS/LG = High self-kindness, low goal directedness, LS/LG = Low self-kindness, low goal directedness.

<sup>a</sup>Median (25<sup>th</sup> percentile, 75<sup>th</sup> percentile), Kruskal–Wallis test. <sup>b</sup>*n* (%).

among the four groups: the median job fitness score in the HS/HG group was 3 (3, 3) score, which was higher than that observed in the LS/LG group (3 (2, 3) score), while the median job reward score in the HS/HG group was 3 (3, 4) score, which was higher than in the HS/LG (3 (2, 3) score) and LS/LG groups (3 (2, 3) score).

Table 3

Comparison of Stress Responses and Job Stress Among the Four Groups

Variable	HS/HG <i>n</i> = 64	LS/HG <i>n</i> = 71	HS/LG <i>n</i> = 80	LS/LG <i>n</i> = 147	<i>p</i>
Stress response					
Fatigue	6 (5, 8) <sup>a</sup>	7 (6, 9)	8 (6, 9) <sup>b</sup>	7 (6, 9)	.026
Anxiety	6 (4, 7) <sup>a</sup>	6 (4, 8)	6 (5, 7)	7 (4, 9) <sup>b</sup>	.034
Depression	5 (3, 7) <sup>a</sup>	6 (3, 7)	6 (4, 8)	6 (5, 8) <sup>b</sup>	.001
Job stress					
Quantitative overload	9 (8, 10)	9 (8, 11)	10 (8, 11)	9 (8, 11)	.578
Qualitative overload	9 (8, 10)	9 (8, 10)	9 (8, 11)	9 (8, 10)	.448
Physical demand	4 (3, 4)	4 (3, 4)	4 (3, 4)	4 (3, 4)	.801
Interpersonal relationships	6 (5, 8)	6 (5, 8)	6 (5, 7)	6 (6, 8)	.359
Workplace environment	2 (1, 3)	2 (2, 3)	2 (2, 3)	2 (2, 3)	.717
Job control	9 (7, 10)	8 (6, 9)	8 (6, 9)	8 (7, 9)	.108
Skill discretion	3 (2, 3)	3 (2, 3)	3 (2, 3)	3 (2, 3)	.633
Job fitness	3 (3, 3) <sup>a</sup>	3 (2, 3)	3 (3, 3)	3 (2, 3) <sup>b</sup>	.001
Job reward	3 (3, 4) <sup>a</sup>	3 (2, 3)	3 (2, 3) <sup>b</sup>	3 (2, 3) <sup>b</sup>	.001

Note. Values are median (25<sup>th</sup> percentile, 75<sup>th</sup> percentile), *p* for Kruskal–Wallis test. Values in a row with different subscripts differ significantly (Bonferroni's multiple-comparison test, *p* < .05/6). Score range: stress response, quantitative overload, qualitative overload, interpersonal relationship, and job control: 3–12; physical demand, workplace environment, skill discretion, job fitness, and job reward: 1–4. HS = high self-kindness; LS = low self-kindness; HG = high goal directedness; LG = low goal directedness.

## Comparison of Lifestyles Among the Four Groups

Table 4 shows the lifestyle data for the four groups. There was one major finding on lifestyle, namely, that the proportion of participants who answered “yes” to the questionnaire item *Do you feel refreshed after a night's sleep?* (the restful sleep item) was higher in the HS/HG group.

Table 4  
Comparison of Lifestyle Among the Four Groups

Variable	HS/HG <i>n</i> = 64	LS/HG <i>n</i> = 71	HS/LG <i>n</i> = 80	LS/LG <i>n</i> = 147	<i>p</i>
Skipping breakfast					.502
No	37 (57.81)	42 (59.15)	49 (61.25)	76 (51.70)	
Yes	27 (42.19)	29 (40.85)	31 (38.75)	71 (48.30)	
Eating speed					.469
Slow	42 (65.63)	44 (61.97)	59 (73.75)	100 (68.03)	
Rapid	22 (34.38)	27 (38.03)	21 (26.25)	47 (31.97)	
Moderate exercise					.353
Yes	19 (29.69)	15 (21.13)	14 (17.50)	31 (21.09)	
No	45 (70.31)	56 (78.87)	66 (82.50)	116 (78.91)	
Physical activity					.135
Yes	27 (42.19)	29 (40.85)	21 (26.25)	48 (32.65)	
No	37 (57.81)	42 (59.15)	59 (73.75)	99 (67.35)	
Smoking status					.206
Non-smoker	34 (53.13)	37 (52.11)	39 (48.75)	59 (40.14)	
Smoker	30 (46.88)	34 (47.89)	41 (51.25)	88 (59.86)	
Alcohol frequency					.888
Rarely	26 (40.63)	28 (39.44)	27 (34.18)	53 (36.05)	
Sometimes	20 (31.25)	19 (26.76)	21 (26.58)	40 (27.21)	
Every day	18 (28.13)	24 (33.80)	31 (39.24)	54 (36.73)	
Alcohol consumption					.810
< 2 glasses	22 (57.89)	29 (67.44)	27 (51.92)	58 (61.70)	
2–3 glasses	12 (31.58)	9 (20.93)	18 (34.62)	26 (27.66)	
> 3 glasses	4 (10.53)	5 (11.63)	7 (13.46)	10 (10.64)	
Restful sleep					.015
Yes	53 (82.81) <sup>a</sup>	55 (77.46)	59 (73.75)	93 (63.27) <sup>a</sup>	
No	11 (17.19) <sup>a</sup>	16 (22.54)	21 (26.25)	54 (36.73) <sup>a</sup>	

Note. Values are *n* (%), *p* for  $\chi^2$  test. Missing values: alcohol frequency: 1 participant, alcohol consumption: 1 participant (The respondents of alcohol consumption were those who answered "sometimes" or "every day" for alcohol frequency).

<sup>a</sup>adjusted residual error  $\leq -2$  or  $\geq 2$ .

## Discussion

The study examined differences in lifestyle, demographic characteristics, physical constitution (BMI), general stress, and job stress among four groups of home delivery drivers, divided according to their scores for self-kindness and goal directedness. The results suggested that participants with high self-kindness and high goal directedness exhibited higher scores for restful sleep, job control, and job reward and lower scores for stress response than the other groups.

These HS/HG participants also felt rested after a night's sleep and tended to practice healthy behaviours, such as eating breakfast, engaging in moderate exercise and physical activity, refraining from smoking and avoiding alcohol, but the differences between this group and the other three groups in these behaviours were nonsignificant. Many researchers have suggested that self-compassion and future time perspective are related to health-promoting behaviours, such as healthy eating (Gellert et al., 2012) and engaging in moderate physical activity

(Stahl & Patrick, 2012). The results of the current study were consistent with those of previous studies and indicated that both self-kindness and goal directedness are important factors in practicing health-promoting behaviours.

In relation to LS/LG participants, HS/HG participants exhibited lower scores for stress responses, including anxiety and depression. In general, stress has been negatively associated with sleep (Knudsen, Ducharme, & Roman, 2007): high stress levels disturb sleep, and poor sleep quality increases stress. The results of the current study indeed show that HS/HG participants had better sleep quality. In addition, HS/HG participants found their work rewarding and felt that they controlled their jobs, indicating that they held positive attitudes towards work. Previous studies reported that these attitudes were related to low levels of stress (Inoue et al., 2014); similarly, the current results indicated that individuals with high self-kindness and high goal directedness experienced less stress because they slept well and held positive attitudes towards their jobs. The maintenance of high levels of sleep quality and low levels of stress is particularly important for professional drivers, because their driving performance and the likelihood of their being involved in traffic accidents have also been associated with sleep quality and stress (Smith, 2016; Stutts et al., 2003; Taylor & Dorn, 2006). Taylor and Dorn (2006) suggested intervention studies to examine the effects of chronic exercise as a strategy for enhancing sleep and reducing fatigue and stress. The current results suggest that both self-compassion and future time perspective are required for drivers to maintain high-quality sleep, manage stress, and improve performance. Future studies are needed to develop programmes fostering these physical and psychological factors related to driving performance and to the likelihood of road traffic accidents, and to examine their effects.

This study was subject to several limitations. First, a cross-sectional survey was used in the study; therefore, cause-and-effect relationships between variables could not be established. However, another study's self-compassion intervention suggested that increases in self-compassion were related to successful behaviour change (Kelly et al., 2010). Future research should examine the effects of increasing self-compassion and future time perspective on health behaviour change, using longitudinal methods. Second, the sample size was small and the number of women was insufficient for analysis; although the finding that participants with high self-kindness and high goal directedness, generally, tend to practice healthy behaviours is useful, the limiting fact that differences between this group and the other groups were nonsignificant might be addressed by future research including large samples and assessing differences in lifestyle and stress according to self-kindness and goal directedness. Third, it is not clear whether the participants categorized as having high self-kindness and high goal directedness in this study have high self-kindness and high goal directedness generally or in fact, because self-kindness and goal directedness did not have cut points adopted. In the previous studies, the median of goal directedness was a score of 15 (Shimpo et al., 2014) and the mean of self-kindness (each item) was a score of 2.82 in Japanese males (Arimitsu, 2014). The scores in this study were thus close to the scores in previous studies.

Despite these limitations, this study showed that Japanese home delivery drivers with high self-kindness and high goal directedness exhibited restful sleep and lower stress responses. Additional research is required to examine the effects of both variables on the promotion of healthy behaviours and management of stress.

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## Competing Interests

The authors have declared that no competing interests exist.

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