

Original

Influence of Flow Experience during Daily Life on Health-related Quality of Life and Salivary Amylase Activity in Japanese College Students

Kazuki Hirao¹⁾, Ryuji Kobayashi¹⁾, Kyota Okishima²⁾ and Yumiko Tomokuni²⁾

¹⁾Graduate School of Health and Science, Kibi International University

²⁾Department of Occupational Therapy, Health Care Sciences, Himeji Dokkyo University

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Abstract

[Objectives]

This study investigated the relations among flow experiences during daily life, health-related QOL as an outcome marker of the health medical field, and salivary amylase activity as a biochemical stress marker in fifty Japanese college students.

[Methods]

Flow experiences were assessed with the flow experience checklist of Ishimura, health-related quality of life (HRQOL) was investigated with the Medical Outcome Study 8-Item Short-Form Health Survey (SF-8), and salivary amylase activity (AMY) was measured with a salivary amylase activity monitor. Spearman's rank correlation coefficient analysis was employed to assess the correlations between the Flow Experience Checklist and SF-8 or AMY.

[Results]

There was a significant correlation between frequency of flow experiences and the duration of the activity, as well as with general health perception (SF-8), social functioning (SF-8), and the mental component summary (SF-8). There was also a significant negative correlation between the duration of the activity and bodily pain (SF-8). There was no significant correlation between the Flow Experience Checklist score and AMY.

[Conclusions]

This study suggested that experiencing flow in daily life is associated with moderate stress, and that mental health is improved by repeating the flow experience.

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—Key words—

Flow Experience, health-related QOL, stress

Introduction

Recently, the concept of flow advocated by Csikszentmihalyi has attracted attention¹⁾. Flow is defined “the holistic sensation that people feel when they act with total involvement”²⁾, “the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it.”³⁾ In other words, flow represents an optimal experience. Experiencing flow in daily life can be a factor in preventing problems of maladaptation and depression⁴⁾. For example, it has been reported that self-esteem and flow experiences are related⁵⁾, while a 4-year study of teenagers show that those still involved had experienced more flow and less anxiety than their peers when engaged in school-related activities⁶⁾. Moreover, Ishimura⁴⁾ found that positive emotions were associated with flow experiences among Japanese college students, while negative emotions were not usually experienced.

However, the relation of flow experience to health-related quality of life (HRQOL) among Japanese college students has not been clarified. In addition, with respect to the relation with stress in daily life, it is a subjective

measure that is based on a questionnaire, and its relation to objective biochemical markers of stress, etc. has not been examined in sufficient. We previously reported that flow experience in a specific occupation led to a reduction of biochemical stress markers⁷⁾, but the relation between flow experiences in daily life and biochemical markers of stress is still unknown.

Accordingly, this study was performed to assess the relations among flow experience in daily life, HRQOL, and biochemical stress markers in Japanese college students.

Methods

The subjects were 50 healthy Japanese college students (8 men and 42 women). The average age of the subjects was 18.46 years (SD = 0.54). All subjects gave written informed consent to participation in this study after receiving an explanation of its purpose.

Flow Experience

Flow experiences were investigated by using the Flow Experience Checklist⁴⁾ of Ishimura.

This Checklist consists of 1 item (seven-point scale) that measures the tendency of a person to experience flow in daily life and 10 items (seven-point scale) that assess the nature of flow experience where the activity has an intrinsic reward. The first item provides an index of the frequency of flow experiences in a person's life, and a higher score means the more daily experience of flow. The other 10 items are composed of 6 items (2 for "Challenge to goals" and 4 for "Confidence in skills") related to the "balance of challenges and skills", which is the precondition for flow experience, and 4 items that measure "Positive emotions and awareness". In addition, the important activities in daily life and the time spent on each activity were determined. The reliability and validity of this scale have been confirmed previously.

HRQOL

HRQOL was assessed by using the Medical Outcome Study 8-Item Short-Form Health Survey (SF-8)⁸⁾, a questionnaire that is a shortened version of SF-36^{9)~11)}. This questionnaire is composed of 8 domains that measure health and each item is answered on a 5- or 6-point scale. The 8 domains are physical functioning, physical role, bodily pain, general health perception, vitality, social functioning, emotional role, and mental health. In addition, there are two summary scores, which are the physical component summary (PCS) and the mental component summary (MCS).

Biochemical Stress Marker

Salivary amylase activity is known as a useful index of sympathetic activity¹²⁾ and was employed as a biochemical marker of stress. Amylase was measured with a salivary amylase activity monitor (Nipro Co., Japan) and test strip (Nipro Co., Japan)¹³⁾¹⁴⁾. We used this measurement method because it was easy and less invasive, since the test strip was placed under the tongue for only 30 seconds, and also because it only required about one minute from saliva sampling until obtaining the result. Salivary amylase was measured with the subject sitting in a room at rest. To reduce the influence of diurnal variation of salivary amylase activity, measurement was done between 9 : 30 and 12 : 00.

Statistical Analysis

For statistical processing, Spearman's rank correlation coefficient analysis was used to assess the correlations between the scores for the Flow Experience Checklist and the SF-8 or salivary amylase.

SPSS software (ver.11.5j for Windows) was used for all analyses. Results are shown as the mean \pm standard deviation (mean \pm SD) and statistical significance was accepted at $p < 0.05$.

Results

The frequency of flow experiences was 4.25 ± 1.69 , the time spent on important daily activities was 7.99 ± 8.41 hours per week, and the total flow score was 51.16 ± 8.6 , while the score for challenge to goals was $10 \pm$

Table 1 Results of assessment with the Flow Experience Checklist

Variable	Mean \pm SD
Frequency of flow experience	4.25 \pm 1.69
Duration of the activity (h/1w)	7.99 \pm 8.41
Total flow score	51.16 \pm 8.6
Challenge to goals	10.0 \pm 3.25
Confidence in skills	18.64 \pm 4.01
Positive emotions and awareness	22.52 \pm 3.6

Table 2 Results of the SF-8 and salivary amylase

Variable	Mean \pm SD
Physical functioning	49.33 \pm 5.31
Role physical	49.58 \pm 5.16
Bodily pain	51.73 \pm 8.61
General health perception	49.56 \pm 7.42
Vitality	49.92 \pm 7.03
Social functioning	46.64 \pm 8.09
Role Emotional	47.1 \pm 6.41
Mental health	43.94 \pm 7.36
PCS	51.17 \pm 5.03
MCS	43.59 \pm 6.63
AMY (kIU/l)	36.48 \pm 19.85

PCS: Physical component summary; MCS: Mental component summary AMY: Salivary amylase activity

Table 3 Correlations between the Flow Experience Checklist and SF-8

Flow Experience Checklist	SF-8
Frequency of flow experience	General health perception ($r_s = .39$) ** Social functioning ($r_s = .35$) * MCS ($r_s = .29$) *
Duration of the activity (h/1w)	Bodily pain ($r_s = -.43$) **

* $p < .05$ ** $p < .01$

3.25, that for confidence in skills was 18.64 \pm 4.01, and that for positive emotions and awareness was 22.52 \pm 3.6 (Table 1). The most important activity in daily life was sport ($n = 27$, 54%), relaxation and entertainment ($n = 12$, 24%), social activity ($n = 1$, 2%), art and music ($n = 6$, 12%), or others ($n = 4$, 8%).

The SF-8 scores were 49.33 \pm 5.31 for physical functioning 49.58 \pm 5.16 for physical role, 51.73 \pm 8.61 for bodily pain, 49.56 \pm 7.42 for general health perception, 49.92 \pm 7.03 for vitality, 46.64 \pm 8.09 for social functioning, 47.1 \pm 6.41 for emotional role, 43.94 \pm 7.36 for mental health, 51.17 \pm 5.03 for PCS, and 43.59 \pm 6.63 for MCS (Table 2). Amylase activity was 36.48 \pm 19.85 (kIU/l) (Table 2).

The frequency of flow experiences showed a significant correlation with the timing of the activity ($r_s = .61$, $p < .01$), general health perception ($r_s = .39$, $p < .01$), social functioning ($r_s = .35$, $p < .05$), and MCS ($r_s = .29$, $p < .05$) (Table 3). There was also a significant correlation between the duration of the activity and bodily pain ($r_s = -.43$, $p < .01$) (Table 3). There was no significant correlation between any item of the Flow Experience Checklist and the salivary amylase level.

Discussion

In the present study, a correlation was observed between the frequency of flow experiences in daily life and the duration of the activity, general health perception, social functioning, and MCS suggesting that the level of mental health is related to experience of flow on a daily basis.

Because experiencing flow seems to encourage a person to persist at and return to an activity¹⁵⁾, a correlation was observed between the frequency of flow experience and the duration of the activity, which is a result in agreement with the concepts of the flow theory. Moreover, it has been found that flow occurs when the balance of challenges and skills are both above average levels for the individual¹⁶⁾. According to Asakawa¹⁷⁾, a Japanese index of psychological well-being (Jujitsu-kan) shows high levels during periods of flow. In this study, a correlation was observed between the frequency of flow experiences and mental health. Thus, it seems that experiencing a lot of flow in daily life has a positive influence on mental health. Moreover, a negative correlation was observed between the duration of the activity and bodily pain. This may be because 50% or more of the subjects listed sports such as volleyball as the activity associated with flow experience, so pain may have increased because of the long time playing sport.

In this study, sport was selected by 50% or more of the subjects as an important activity in daily life, but this is not surprising because it is thought that young persons (17–22 years) rely more on idiosyncratic body movement to give shape to their experience²⁾. In the present study, there was no significant correlation between flow experiences and the salivary amylase activity. Ishimura & Kodama¹⁸⁾ investigated the relation between flow experience and the stress response by a questionnaire survey of Japanese college students and found no correlation, which agrees with our results. Thus, it appears that both subjective and objective stress is not related to experience of flow in daily life. It is thought that flow experience arises from the process of aiming at a difficult target, and thus is not necessarily pleasant²⁾.

The present study suggested that experiencing flow in daily life is moderately stressful, but improves mental health as a result of repeating the experience every day.

Finally, this was a cross-sectional study and the causal relation between the factors we assessed could not be clarified, so a longitudinal study should be performed in the future. Despite this limitation, the study revealed a significant correlation between the frequency of flow experiences in daily life and mental health among Japanese college students, while there was no significant correlation with a biochemical marker of stress. As it has been reported that flow experiences are common awareness experiences¹⁵⁾, there is a possibility that similar results can be obtained from Japanese workers. However, flow experiences in Japanese workers have not been sufficiently investigated, so we plan to investigate the influence of flow experiences in daily life on health-related QOL and salivary amylase activity.

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Reprint request:

Kazuki Hirao
Graduate school of Health and Science, Kibi International University, 8, Iga-machi, Takahashi city, Okayama, 716-8508, Japan.

別刷請求先 〒716-8508 岡山県高梁市伊賀町 8
吉備国際大学大学院保健科学研究科
平尾 一樹

日本人大学生の日常生活におけるフロー体験と健康関連 QOL, 唾液アミラーゼ活性との関連

平尾 一樹¹⁾, 小林 隆司¹⁾, 沖嶋今日太²⁾, 友國由美子²⁾

¹⁾吉備国際大学大学院保健科学研究科

²⁾姫路獨協大学医療保健学部作業療法学科

キーワード

フロー体験, 健康関連 QOL, ストレス

〔目的〕

本研究は, 日本人大学生 50 名を対象に日常生活におけるフロー体験と保健医療領域のアウトカム指標である健康関連 QOL, ストレスの生化学指標である唾液アミラーゼ活性との関係を明らかにすることを目的とした。

〔方法〕

フロー体験は石村のフロー体験チェックリスト, 健康関連 QOL は SF-8, 唾液アミラーゼ活性は唾液アミラーゼモニター (Nipro Co., Japan) を用いて測定した。フロー体験チェックリストの得点と SF-8 の得点, 唾液アミラーゼ活性値との相関関係を Spearman's rank order correlation test により解析した。

〔結果〕

フロー体験の頻度と活動時間, 全体的健康感, 社会生活機能, 精神的サマリースコアとの間に有意な正の相関を認めた。さらに活動時間と体の痛みとの間に有意な負の相関が認められた。また, フロー体験チェックリストと唾液アミラーゼ活性値との間には有意な相関を認めなかった。

〔結論〕

日常生活においてフローを経験することは, 適度なストレス状態にあり, その経験を日々の生活で繰り返すことにより精神的健康を高める可能性が示唆された。

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