Effects of Regular Group Physical Exercise on Affectivity and Perceived Social Support

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by
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Abstract

This experimental study examined the effects on the changes in affectivity and perceived social support by regular group physical exercise (n = 20) as compared with regular social gatherings (n = 20), with 40 participants who age 18-40 and had not regularly participated in any physical exercise twice a week for more than one week within the preceding 3 months of the experiment. Eligible participants were allocated to the experimental and control group randomly. Those in the experimental group were asked to take part in any kind of group physical exercise twice a week with duration of around one hour each time, and each session would be distributed evenly within the week. In the control group, the correspondent participants were requested to have gathering with friends with the same duration, frequency and distribution as those in the experimental group. The entire intervention period lasted for three weeks. Participants were invited to complete a pack of questionnaires before and after the experiment. Results suggested that regular group physical exercise increased the degree of positive affect and perceived social support from friends and significant others significantly. The mechanisms of the resulted casual relationships and their practical implications were discussed. Since study of effects of group physical exercise on social support is such a new area that none of the previous researchers had done, in addition to the main focus on the reduction of negative affect in the extent literature and lack of current research about the effect of physical exercise on positive affect, this study can serve as a pioneering analysis in these topics for future research.
Physical exercise means form of leisure physical activity undertaken with a specific external objective such as the improvement of fitness, physical performance or health, in which the participant is advised to conform to recommended mode of intensity, frequency and duration of such activity (Bouchard & Shephard, 1991). Physical exercise has been consistently and reliably implicated in the reduction of all-cause mortality (Blair, Kohl, Paffenbarger, Clark, Cooper, & Gibbons, 1989), cardiovascular disease and a host of other debilitating conditions (Bouchard, Shephard, Stephens, Sutton, & McPherson, 1990). Besides that, the robustness of physical exercise effects on psychological health and well-being is also demonstrated in much research. For instance, some recent studies showed that aerobic exercise resulted in lowered state anxiety and higher tranquility scores (e.g., Focht & Hausenblas, 2001; Ekkekakis, Hall, & Petruzzello, 1999). In another study, physical exercise was shown to reduce clinical depression (Craft, 2005). Moreover, participants in a study done by Blumenthal et al. (1999) who were diagnosed as clinically depressed showed that, after 16 weeks of either a supervised aerobic exercise program three times per week, a medication treatment, or a combined treatment of medication and exercise, the sole exercise group showed significantly reduction in the depressive symptoms as effectively as the other two treatment groups. In this study, we would further explore the relationship between physical exercise and individuals’ psychological well-being.

Distinction among emotion, mood and affect

Emotion, mood or affect is one of the most popular research topics in physical exercise effects on psychological well-being these days. Psychology researchers have distinguished among the terms emotion, mood and affect all along. Mood represents a transient state whereas affects represents
something more enduring (Lazarus, 1991). Mood is distinct from emotions, which are also brief but tend to be both stronger and more situation-specific (Batson, Shaw, & Oleson, 1992; Morris, 1989). Affect is a more general term that refers to the quality of the subjective experience that characterizes all responses, including emotions and moods, and it requires the least amount of cognitive involvement (Batson et al., 1992). Despite the various distinctions among mood, affect and emotion, most researchers actually use them interchangeably when studying their relationship with physical exercise (Arent, Landers, & Etnier, 2000; McAuley, & Rudolph, 1995), and results showed that exercise could conceivably induce changes at all levels of the continuum of emotions, moods and affects (Ekkekakis & Petruzzello, 1999).

Physical exercise and affectivity

Compared with emotion and mood, affect is a more inclusive dimension that refers to the way a person, situation or event makes one feel. There are plenty of cross-sectional and longitudinal nonintervention studies demonstrate an association between physical exercise and affect, such as Fukukawa et al. (2004) and Lee & Russell (2003). A meta-analysis on physical exercise and mood also shows a large effect size (ES) on both positive (ES=0.42) and negative (ES=0.47) affect across all forms of physical exercise (Arent et al., 2000). Since then, we would focus on the relationship between physical exercise and affectivity in this study.

Affectivity could be differentiated into two personality dimensions: Positive affectivity (PA) and Negative affectivity (NA). Positive affectivity (PA) is the disposition to feel positive affect, reflecting one’s enthusiasm, activity and alertness. High PA is a state of high energy and pleasurable engagement,
whereas low PA is characterized by sadness and lethargy. Examples of PA adjectives are interested, excited, strong, etc. Negative affectivity (NA) is the disposition to feel negative affect, associating with feelings such as anger, contempt, disgust, guilt, fear and nervousness. Low NA is a state of calmness. Examples of NA adjectives are distressed, upset and sacred. Contrary to intuition, positive affectivity and negative affectivity are not opposites— they are uncorrelated, or orthogonal, and are graphically depicted as falling at right angles to one another. That is, a person who does not get a high score on a happiness or enthusiasm scale may not necessarily get a high score on an anxiety or anger scale (Watson, Clark, & Tellegen, 1988).

Though there are many studies about the relationship between physical exercise and affectivity, the extent literature in this area has typically focused on the anxiety-reducing, stress-dampening, antidepressant effects or diminution of negative affectivity by physical exercise (e.g., Craft, 2005; North, McCullaugh, & Tran, 1990; Mutrie, 2001; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991). That means, the majority of these studies examined negative affect only, predominantly depression. Solely focusing on the amelioration of negative symptomology in emotional aspects is a rather restrictive perspective. In fact, study of positive affect is as important as that of negative affect, and the exploration on how to increase positive affect becomes more and more prevalent nowadays. A research done by Warner and Strowman (1995) showed that increases in systolic and diastolic blood pressures were associated with more positive affect and unrelated to negative affect with college students who engaged in non-threatening conversations. It illustrates that studies assessing positive affect is believed to be important and necessary, especially when there is not much research done in this area. Because of the constant focus on negative affect in most of past studies, this research would
examine the effects of physical exercise on both of the negative and positive affects by Hypothesis I, regular physical exercise could reduce the degree of participants’ negative affect, and Hypothesis II, regular physical exercise could enhance the degree of participants’ positive affect, respectively.

Physical exercise and perceived social support

Similarly, social support has been consistently correlated to physical exercise (Trost, Owen, Bauman, Sallis, & Brown, 2002) as well. There are many definitions of social support. Nonetheless, most of these definitions could not encompass a full understanding of social support, and there is little consensus on an exact definition of this construct. For example, ‘knowing that one is loved and that others will do all they can when a problem arises’ (Sarason, Sarason, & Pierce, 1990a, p. 119) and ‘an exchange of resources between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient’ (Shumaker & Brownell, 1984, p. 13). Also, various terms have been used to describe social support, including social network size, social integration, quantity of relationship, social resources, satisfaction with support, perceived and received support, and structural and functional elements of support (e.g., Cohen, 1988; Cohen, Underwood, & Gotlieb, 2000; House & Kahn, 1985; Sarason, Sarason, & Pierce, 1990b).

In between all these definitions, social support could be categorized into two aspects: received and perceived social support. Received social support focuses on assessing the amount of support that is received in a particular period of time. On the other hand, perceived social support focuses on the perceived availability of different types of social support. It was suggested that a social activity is said to involve social support if it was perceived by the recipient of that activity as esteem enhancing or if it
involved the provision of stress-related personal aid such as emotional support (Heller, Swindle, and Desenbury, 1986, p. 467). That is social support is not salient when the recipient does not perceive it. Since some research indicates that perceived support is a stronger predictor of well-being than received support (Cohen & Wills, 1985; Mason, Jay, Todd, & Boris, 2007), we would measure the perceived social support of our participants in this study.

The advantages of social support to psychological well-being have been shown in much research. For instance, individuals with greater social support are less likely to suffer from various psychological disorders (Schwarzer & Leppin, 1992), strong social ties was associated with few symptoms of depression for Japan and the United States older adults (Sugisawa, Shibata, Hougham, Sugihara, & Liang, 2002), patients with a chronic disease who perceived different types of social support as readily available had less anxiety and more positive affect as long as 1 year later (Sherbourne & Hays, 1990). Social support is also associated with better physical well-being as well as better psychological well-being (Hays, Turner, & Coates, 1992; Holahan, Moos, Holahan, & Brennan, 1997; House, Landis, & Umberson, 1988). For example, individuals with high levels of social support have more rapid recovery from illness, (e.g. Helgeson, 1991; King, Reis, Porter, & Norsen, 1993), and lower mortality rate (e.g. Rosengren, Orth-Comer, Wedel, & Wilhemlmsen, 1993; Berkman, Leo-Summers, & Horowitz, 1992; Spiegel & Kato, 1996). Due to its benefits to our well-being shown in past research, it is worthwhile further examining its relationship with physical exercise in our study.

Physical exercise was found to be positively associated with social support and negatively associated with social isolation, and this support was mainly obtained from family, friends and
significant others (Trost et al., 2002). However, we should note that most of this research studied how social support decreased participants’ competitive stress (Crocker, 2002), enhanced their performance (Madden, Kirkby, & McDonald, 1989), improve the rehabilitation and recovery from sporting injury (Williams, Rotella, & Scherzer, 2001), and motivated participants to commit in physical exercise (Albrecht & Adelman, 1984; Cohen, 1988). Conversely, no research was found on the effect of physical exercise on social support. Since a study done by Lewinsohn (1976) showed that the increase of pleasant activities and social interaction could help the depressed individuals increase their level of positive reinforcement, correspondingly, we can use similar principle to test whether group physical exercise would also increase the perceived social support. Because of this reason, we would arrange group exercise in our study to test the Hypothesis III, group physical exercise could enhance participants’ perceived social support.

Motivation as the confounding variable

In order to examine the above hypotheses accurately, we needed to look into other variables which might also affect the results of this research. Participants’ motivation toward the physical exercise is one of our concerns as it could affect how much participants involve in the activity and so influence how much effect obtained in the activity. Motivation refers to the initiation, direction, intensity and persistence of behavior (Geen, 1995). Intrinsic motivation is being motivated by internal factors, as opposed to the external drivers of extrinsic motivation. It was first coined by Deci (1971) that psychological processes or drives were fuelled by intrinsic enjoyment of the activity itself, felt competent and self-determining. The Self-determination theory first suggests that intrinsic motivation
is influenced by individuals’ degree of autonomy or self-determination. That is the degree to which people endorse their actions at the highest level of reflection and engage in the actions with a full sense of choice. Enjoyment has also been identified as a key reason for participation in youth sport (Brustad, Babkes, & Smith, 2001; Weiss & Petlichkoff, 1989), and it has been positively associated with perceptions of task-involving coach motivational climate (e.g., Goudas, 1998; Newton & Duda, 1999). Perceived value or usefulness of the activity is another intrinsic motivational factor. It states that individuals internalize the idea and become self-regulating with respect to activities that they experience as useful or valuable for themselves. It has also been studied in many internalization studies (e.g., Deci, Eghrari, Patrick, & Leone, 1994). In this study, we would like look into participants’ extent of self-determining, enjoyment of the exercise and the perceived value or usefulness of the activity by testing their perspective on self and environment perception. Social motivation such as their interest and motivation to work would also be measured.

Personality as the confounding variable

Many researchers showed interests in studying how sports or physical exercises affect personality and vice versa. Although no evidence support claimed that sport and physical exercise affect overall personality, the rapidly expanding research demonstrated the psychological benefits of physical exercise for confidence and self-esteem. For instance, past studies illustrated that physical exercise could be related to individuals’ self-concept, self-esteem and self-efficacy (Fox, 1997), and exercise were associated with significant increases in self-esteem, especially among individuals who were initially lower in self-esteem (Sonstroem, 1997a, 1997b). Besides, the changes in self-esteem could be
maintained over a period of time (at least one year) (Hardcastle & Taylor, 2005). Conversely, some particular traits might also predict higher elite, such as those who experienced fewer problems with anxiety, who were more successful at deploying their concentration, who were more self-confident or who relied more on internally referenced and kinesthetic mental preparation. In this study, we would also take a look at whether physical exercise affects participants’ personalities. In addition, we would also pay attention to whether participants’ various personalities act as confounding variables influencing the affects and perceived social support other than regular physical exercise.

Hope as the confounding variable

Relationships between hope and psychological health were shown in much past research, so it is another variable we should be aware of. Hope is defined as the perceived capability to derive pathways to desired goals, along with the perceived motivation to use those pathways via agency. Specifically, hope is a cognitive set that is comprised of a reciprocal action between the sense of goal-directed determination (agency) and the ability to generate plans to achieve those goals (pathways). Pathways thoughts reflect one’s appraisal of the capability to persevere in the goal journey, while agency reflects one’s perception that he or she can begin movement along the imagined pathways to goal.

Regarding mental health, hope theory (Snyder, 2000) proposed that emotions are the by-product of goal-directed thought. As such, the more important a goal and the greater the perceived likelihood of success in attaining that goal, the greater will be the positive affect experienced by the person. Supporting this proposition, it was found that persons who pursue their goals under unimpeded circumstances experience positive emotions, whereas persons who are confronted with obstacles in
their goal pursuits experience negative emotions (Snyder, Sympson, Ybasco, Borders, Babyak, & Higgins, 1996). Similarly, higher scores on the Hope Scale was correlated positively with measures of positive emotions and negatively with indices of negative emotions (Snyder, Harris, Anderson, Holleran, Irving, Sigmon, Yoshinobu, Gibb, Langelle, & Harney, 1991), and high-hope individuals reported of low levels of depression (Snyder, Hoza, Pelham, Rapoff, Ware, Danovský, Highberger, Ribinstein, & Stahl, 1997; Snyder et al., 1996). Despite the effect on the affectivities, hope was also proved to affect the degree of social support. People with high hope were likely to have friends with whom they shared a strong sense of mutuality and support (Crothers & Schraw, 1999; Sarason et al., 1990a), while people with low hope tended to be lonely and lack of friends from whom they could seek support (Crothers & Schraw, 1999). As we can see, the level of hope would probably affect both of affectivity and perceived social support, we should be aware of the difference of level of hope among our participants too.

Depression intensity

According to the statistic of the Food and Health Bureau in 2003, 2004 and 2005, the number of patients diagnosed as suffering from depression has been reported as 16,561, 18,586 and 21,240 respectively. The increment was 12.2% and 14.3% respectively. The prevalence of major depression in America increases steadily as well during the past 50 years (Kessler et al., 2003). Although most of the time depression is treated through prescription drugs or therapy, a recent Gallup poll identified exercise as a close second behind religion as an effective alternate mean of relieving depression. In addition, physical inactivity has been shown in related to higher levels of depression. In one interesting
early study, depressed participants were randomly divided into running group, time-limited psychotherapy group or time-unlimited psychotherapy group. Results showed that the runners showed a significant decrease in depression scores, comparable to the best outcomes obtained by either psychotherapy group (Griest, Klein, Eischens, & Faris, 1978). Consistent agreement also appears among other studies about the moderate relationship between physical exercise and depression (e.g., Calfas & Taylor, 1994; Craft & Landers, 1998; Martinsen & Stephens, 1994; Morgan, 1994; Mutrie & Biddle, 1995). Form these review, it found that physical exercise, both aerobic and anaerobic, is as effective as psychotherapy in reducing depression, and such reductions in depression following physical exercise do not depend on fitness levels. As the relationship between physical exercise and depression has been shown to be robust, the depression level of the participants would also be examined in our study.

Method

Participants

A total of 40 participants, age 18 to 40 years, were recruited during the grant period. The mean age was 26.08. Female participants comprised 47.5% (19/40), and male participants comprised 52.5% (21/40) of the study group. 10% (4/40) of participants were students, and 90% (36/40) were under employment. Of the 40 participants, 20 were enrolled in the experimental group randomly with 11 male and 9 female while the remaining 20 were enrolled in the control group with 10 male and 10 female.
Questionnaire

The questionnaire used in this research is a composite of various Chinese versions of inventories (Appendix I). The focus of the study, Positive and Negative Affect Scale (PANAS), consists of 10 positive affects (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and 10 negative affects (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid). Respondents are asked to rate items on a scale from 1 to 5, based on the strength of emotion where 1 = "very slightly or not at all," and 5 = "extremely" (Watson et al., 1988). 10 items of positive affect and 10 items of negative affect were summed separately. Higher scores indicate higher degree of the corresponding affectivity.

Initial studies in development of the PANAS showed that the reliability was high (0.39 to 0.71). In this study, the reliability of PANAS even reaches 0.82. Also, demographic variables had only very modest influences on PANAS scores and the PANAS exhibited measurement invariance across demographic subgroups (Watson et al., 1988). In recent studies of the structure of affect, positive and negative affects have consistently emerged as two dominant and relatively independent dimensions. Though there is a number of mood scales have been created to measure mood and affects, many existing measures are inadequate, showing low reliability or poor convergent or discriminated validity, but PANAS could fulfill the need for the reliability and validity (Crawford, & Henry, 2004).

Another focus of this study, the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988), is a 12-item scale which measures perceived support from family, friends and significant others. Respondents answer items on a 7-point Liker-type scale (from “very strongly disagree” to “very strongly agree”). Sum up the total score of the 12 items. Higher
scores indicate higher level of perceived social support.

The reliability, validity and factor structure of the MSPSS have been demonstrated high across a number of different samples including university students (Dahlem, Zimet, & Walker, 1991; Kazarian & McCabe, 1991; Zimet et al., 1988), pregnant women (Zimet, Powell, Farley, Werkman, & Berkoff, 1990), adolescents living abroad (Zimet et al., 1990), pediatric residents (Zimet et al., 1990), urban adolescents (Canty-Mitchell & Zimet, 2000), adolescents on an inpatient psychiatry unit (Kazarian et al., 1991), and psychiatric outpatients (Cecil, Stanley, Carrion, & Swann, 1995). The Cronbach's alpha of this study is 0.91.

The Activity Perception Questionnaire is a 25-item version of the Intrinsic Motivation Inventory (IMI). Respondents answer items on a 7-point Liker-type scale (from “not at all true” to “very true”) (Deci et al., 1994). IMI is a multidimensional measurement device intended to assess participants’ subjective experience related to a target activity. The instrument assesses participants’ interest/enjoyment, perceived competence, effort, value/usefulness, felt pressure and tension, and perceived choice while performing a given activity, thus yielding six subscale scores. Recently, a seventh subscale has been added to tap the experiences of relatedness, although the validity of this subscale has yet to be established. Past research suggests that order effects of item presentation appear to be negligible, and the inclusion or exclusion of specific subscales appears to have no impact on the others. Thus, it is rare that all items have been used in a particular experiment. Instead, experimenters have chosen the subscales that are relevant to the issues they are exploring.

In this study, we selected the Activity Perception Questionnaire which assesses three subscales only: interest/enjoyment, perceived choice and value/usefulness, by summing up the scores of the
three subscales separately. Higher scores indicate higher level of the corresponding variables. The reliability of the questionnaire in this study is satisfied (Cronbach's alpha = 0.85).

The Hope Scale (Snyder et al., 1991) is a 12-item scale which measures agency and pathways components. Respondents answer items on a 4-point Liker-type scale (from “very strongly disagree” to “very strongly agree”). Four of the items are distracters and are not used for scoring. Summing across the four items from subscale Pathway and four items from subscale Agency, the total Hope Scale score is derived.

A series of studies demonstrates acceptable internal consistency and test-retest reliability for the Hope Scale (e.g., Snyder et al., 1997; Vernberg, D., Snyder, C.R., & Schuh, M., 2005), and the reliability of the scale in this study is 0.50. The factor structure identifies the agency and pathways components of goal achievement and, as predicted, these two components are positively correlated. Convergent and discriminant validity are documented, along with evidence suggesting that Hope Scale scores augmented the prediction of goal-related activities and coping strategies beyond other self-report measures. Construct validitional support is provided in regard to predicted goal-setting behaviors. Moreover, the hypothesized goal appraisal processes that accompany the various levels of hope are corroborated (Snyder et al., 1991).

Beck Depression Inventory (BDI) is a 21-item self-report rating inventory measuring characteristic attitudes and symptoms of depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The 21 items are interpreted as measuring the sadness, pessimism, sense of failure, dissatisfaction, guilt, expectation of punishment, dislike of self, self accusation, suicidal ideation, episodes of crying, irritability, social withdrawal, indecisiveness, change in body image, retardation, insomnia, fatigability,
loss if appetite, loss of weight, somatic preoccupation and low level of energy. The level of
depression is rated by the total score added up for each of the twenty one questions. It is differentiated
by ‘ups and downs depression which are considered normal’ (score 5-9), ‘mild to moderate depression’
(score 10-18), ‘moderate to severe depression’ (score 19-29) and ‘severe depression’ (30 or above).
For those who got score below 4 would probably be denial of depression or faking good as this is
below usual scores for normal. For those who got score over 40 is viewed as significant levels of
depression (Groth-Marnat, 1990).

The original version of the BDI was introduced in 1961. The BDI demonstrates high internal
consistency with alpha coefficients of 0.86 and 0.81 for psychiatric and non-psychiatric populations
respectively (Beck, Steer, & Garbin, 1988), and high split-half reliability with coefficient of 0.93. A
Chinese version of BDI was developed and was found to have high internal consistency as a scale and
high item-total correlations for most of the items. In some studies, discriminant analysis has found that
the translated version of the revised BDI also highly discriminated depressive symptoms in Chinese
speaking people (Shek, 1990). In this study, we have also used the Chinese version and its Cronbach's
alpha is 0.87 which is also satisfactory.

State-Triat Anxiety Inventory is a self-report assessment device initially conceptualized as a
research instrument for the study of anxiety in adults (Spielberger, Gorsuch, Lushenem Vagg, &
Jacobs, 1983). It consists of 20 items to assess state anxiety (STAI-Y1), and another 20 items to assess
trait anxiety (STAI-Y2). These two parts differ in the item wording, in the response format (intensity
vs. frequency) and in the instructions for how to respond. Trait anxiety denotes “relatively stable
individual difference in anxiety proneness…” In this study, STAI-Y2 was used to find out the
Scores on the STAI have a direct interpretation, that is, high scores on their respective scales mean more trait or state anxiety and low scores mean less. The reliability coefficient of STAI-Y2 ranged from 0.65 to 0.86, and the reliability of this study is 0.89, even a little bit higher than the normal range. In other studies, it was found that their correlations between this scale and other measures of trait-anxiety such as the Taylor Manifest Anxiety Scale, the Institute of Personality and Ability Testing Anxiety Scale, and the Multiple Affect Adjective Check List are 0.80, 0.75, and 0.52 respectively.

The Social Adaptation Self-evaluation Scale (SASS) is a 21-item self-rating scale developed to detect presumed treatment differences in social motivation and behavior that may not be discernible in psychiatric assessment. It was originally developed for the evaluation of patients’ social motivation and behavior in depression. SASS was validated in a large general population survey, and its substantial external and internal validity, test-retest reliability, and sensitivity to change have been described (Bosc, Dubini, & Polin, 1997). Its reliability in this study is also high (Cronbach's alpha=7.60). The scale focuses on the patient’s self-perception and motivation toward action rather than on objective performance. The time period assessed is "now." The first two items (interest in one’s occupation and one’s home-related activities) are mutually exclusive for scoring purposes. If the respondent endorses having an occupation, the occupation item is used, otherwise the home-related item is used.

The Temperament and Character Inventory (TCI) is a set of tests designed to identify the relationships and the intensity of each of the seven basic personality dimensions of Temperament and
Character, that interact in ways to create the unique overall personality of an individual (Cloninger, Przybeck, Svrakic, & Weltzel, 1994). Cloninger et al. (1994) have conceptualized temperament as consisting of four dimensions: novelty seeking, harm avoidance, reward dependence, and persistence. In addition, they described character as comprising three dimensions labeled self-directedness, cooperativeness, and self-transcendence. From this theoretical perspective, temperament is largely considered to be genetically determined and linked to neurochemical systems, whereas character is considered to be more environmentally influenced and has been linked to different psychotherapeutic approaches. In this study, TCI-125, a shorter version of TCI, was used, and respondents were requested to answer items on True or False format. The reliabilities of the seven personality dimensions are 0.73, 0.85, 0.51, 0.51, 0.82, 0.65 and 0.80 respectively.

Design

Inclusion criteria were those who aged between 18 and 55 and have not regularly participated in any physical exercise twice a week for more than one week within the preceding 3 months of the experiment. They were allocated to the experimental and control group randomly. Those in the experimental group were asked to take part in any kind of group physical exercise, such as playing badminton, table tennis, squash (with two participants each time) or tennis, arranged by the researcher twice a week with duration of around one hour each time, and each session would be distributed evenly within the week. In the control group, the correspondent participants were requested to have gathering with friends with the same duration, frequency and distribution as those in the experimental group. The entire intervention period lasted for three weeks.
Procedure

A screening form was launched to the participants initially. After completed the screening form, those who were eligible for this research would be invited to take part in the research and they were assigned to either the experimental group or the control randomly. Before the experiment, informed consents were given to selected participants and they were asked to fill in the pack of questionnaires. At the end of the last session, participants would fill in the same pack of questionnaires.

Statistical Analysis

For hypotheses I and II, the scores of the positive affects and the negative affects were computed separately in the pre-test and post-test in order to find out the degrees of positive and negative affects of the participant before and after the experiment. For hypothesis III, the scores of the MSPSS were computed in the pre-test and post-test as well, so as to acquire the levels of perceived social support from family, friends and significant others. All these variables were analyzed using analysis of covariance (ANCOVA) with the baseline score used as the covariate, in order to test the effect of regular physical exercise or that of social gathering if any.

Results

In contrast to the prediction, there was no significant difference in negative affect as measured by PANAS between the two groups ($F_{19, 15} = 1.40, p = 2.34$). Its mean and standard deviation (SD) are 23.20 and 5.06 respectively. Conversely, consistent to the prediction, the degree of positive affects of PANAS showed significant difference with the intervention of regular physical exercise ($F_{19, 15} = 2.83,$
Consistent to the prediction, the scores of the MSPSS showed significant difference with the intervention of regular group physical exercise ($F_{19, 19} = 3.13$, $p = 2.17$). The mean is 79.38 and the SD is 12.94. The means (M) and SDs of the three subscales of the MSPSS are as follows respectively: Family (M = 19.53, SD = 5.11), Friends (M = 37.90, SD = 6.02) and Significant Others (M = 21.95, 3.88). In spite of the significance of the total scores of MSPSS, the scores of the subscale Family failed to reach significant difference with group physical exercise ($F_{19, 19} = 1.79$, $p = 2.17$), which is contrast to the prediction. On the other hand, consistent to the prediction, significant differences were shown in the scores of subscale Friends ($F_{19, 19} = 4.49$) and Significant Others ($F_{19, 19} = 6.01$, $p = 2.17$). The estimated marginal mean and standard error of PANAS and MSPSS were shown in Table 1.

**Table 1**

*Estimated Marginal Mean and Standard Error of Group Physical Exercise and Social Gathering on different Inventory*

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Subscale</th>
<th>Estimated Marginal Mean</th>
<th>Standard Error</th>
<th>Estimated Marginal Mean</th>
<th>Standard Error</th>
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<td>Social gathering</td>
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<td>$n = 20$</td>
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</table>

*p < .005.*
The scores of other variables have no significant differences with intervention of regular exercise. For the Activity Perception Questionnaire: total scores ($F_{16, 15} = 1.07$, $p = 2.38$), scores of subscale Interest/Enjoyment ($F_{17, 17} = 1.49$, $p = 2.27$), scores of subscale Value/Usefulness ($F_{16, 16} = 1.02$, $p = 2.33$), scores of subscale Perceived Choice ($F_{17, 18} = 1.53$, $p = 2.23$). For the Hope Scale: total scores ($F_{19, 19} = 1.81$, $p = 2.17$), scores of subscale Pathway ($F_{19, 19} = 1.02$, $p = 2.17$), scores of subscale Agency ($F_{19, 19} = 1.96$, $p = 2.17$). For the BDI score: ($F_{18, 19} = 1.10$, $p = 2.18$). For the STAI-Y2 score: ($F_{18, 19} = 1.14$, $p = 2.18$). For the SASS score: ($F_{19, 19} = 1.19$, $p = 2.17$). For the TCI-125: total scores ($F_{12, 18} = 1.62$, $p = 2.34$), scores of subscale Harm Avoidance ($F_{18, 19} = 2.17$, $p = 2.18$), scores of subscale Reward Dependence ($F_{17, 19} = 1.33$, $p = 2.20$), scores of subscale Persistence ($F_{18, 19} = 1.66$, $p = 2.18$), scores of subscale Self-directedness ($F_{14, 18} = 1.15$, $p = 2.29$), scores of subscale Cooperativeness ($F_{16, 19} = 1.07$, $p = 2.21$) and scores of subscale Self-transcendence ($F_{19, 19} = 1.095$, $p = 2.17$). Interestingly, participants showed significant increment in Novelty Seeking ($F_{18, 19} = 4.11$, $p = 2.18$) after regular physical exercise. The means and SDs of these inventories are showed in Table 2.
Table 2
Mean and Standard Deviation of different Inventories

<table>
<thead>
<tr>
<th>Inventories</th>
<th>Subscale</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity Perception Questionnaire</td>
<td></td>
<td>114.40</td>
<td>17.77</td>
</tr>
<tr>
<td>Interest/Enjoyment</td>
<td>38.58</td>
<td>7.43</td>
<td></td>
</tr>
<tr>
<td>Value/Usefulness</td>
<td>40.40</td>
<td>9.27</td>
<td></td>
</tr>
<tr>
<td>Perceived Choice</td>
<td>35.53</td>
<td>5.30</td>
<td></td>
</tr>
<tr>
<td>Hope Scale</td>
<td>23.08</td>
<td>3.10</td>
<td></td>
</tr>
<tr>
<td>Pathway</td>
<td>11.98</td>
<td>1.69</td>
<td></td>
</tr>
<tr>
<td>Agency</td>
<td>11.10</td>
<td>1.65</td>
<td></td>
</tr>
<tr>
<td>BDI</td>
<td>8.10</td>
<td>6.67</td>
<td></td>
</tr>
<tr>
<td>STAI-Y2</td>
<td>44.16</td>
<td>6.56</td>
<td></td>
</tr>
<tr>
<td>SASS</td>
<td>39.69</td>
<td>6.61</td>
<td></td>
</tr>
<tr>
<td>TCI-125</td>
<td>71.03</td>
<td>8.68</td>
<td></td>
</tr>
<tr>
<td>Novelty Seeking</td>
<td>8.64</td>
<td>3.77</td>
<td></td>
</tr>
<tr>
<td>Harm Avoidance</td>
<td>10.46</td>
<td>4.83</td>
<td></td>
</tr>
<tr>
<td>Reward</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependence</td>
<td>8.95</td>
<td>2.51</td>
<td></td>
</tr>
<tr>
<td>Persistence</td>
<td>2.59</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>Self-directedness</td>
<td>14.33</td>
<td>4.97</td>
<td></td>
</tr>
<tr>
<td>Cooperativeness</td>
<td>19.16</td>
<td>3.20</td>
<td></td>
</tr>
<tr>
<td>Self-transcendence</td>
<td>6.33</td>
<td>3.61</td>
<td></td>
</tr>
</tbody>
</table>

*p < .005.

Discussion

Affectivity change

The main finding from this study was that individuals showed increment in level of positive affect with regular physical exercise. This result is consistent with that of previous studies, which demonstrated an association between physical exercise and positive affect.

There might be some other psychological factors induce the change in affect with regular exercise.

Past research illustrated that there might be other mediators could explain the affective changes by
physical exercise such as individuals’ motivation, the perception of the activity, hope and personality as mentioned above. Therefore, we tried to control these variables at our best. For instance, participants who have not regularly participated in any physical exercise twice a week for more than one week within the preceding 3 months of the experiment would be selected only, so as to control their motivation towards regular physical exercise. In order to obtain a more accurate result, all these possible confounding variables were also examined in this study. As analyzed by using ANCOVA, results indicated that no significant change was shown for these variables even with the intervention of regular physical exercise. Therefore, we could be sure that the increase of level of positive affect with physical exercise was not due to participants’ motivation, perception of physical exercise, hope and personality.

Physiological and psychological mechanisms

Physiological mechanism might be one of the explanations between physical exercise and affective change. For instance, the elevation in body temperature caused by physical exercise which induces a tranquilizing effect (deVries, 1981); the release and subsequent binding of endorphins to receptor sites in the brain (Steinberg & Sykes, 1985), etc. Besides the physiological mechanism, psychological processes might be a mediator between physical exercise and affect as well. One popular explanation for the positive relationship between physical exercise and affect is the distraction hypothesis (Bahrke & Morgan, 1978), which suggests that physical exercise provides a diversion from the stresses of life by acting as a useful distraction or ‘time-out’ from stressful stimuli and feelings, and so leads to improved psychological wellness. Self-efficacy (Bandura, 1977) might be another possible
mediator. It implies that improvement in physical function as a result of physical exercise leads to increased perception of self-efficacy. Such increment of self-efficacy could moderate individuals’ affective reaction in certain degree (Jerome, Marquez, McAuley, Canaklisoval, Snook, & Vickers, 2002; Marquez, Jerome, McAuley, Snook, & Canaklisova, 2002; McAuley, Talbot, & Martinez, 1999). That is, exercise efficacy or mastery cognitions play a moderating role in enhancing affective responses. However, one of the limitations of our study is that the above physiological and psychological variables have not been measured.

Although considerable evidence indicated the association between physical exercise and negative affect (e.g., Arent et al., 2000), our research showed no significant difference in negative affect with regular physical exercise. The contradiction of our results to previous research results might be due to participants’ low intensity of depression. From the results of the BDI, it showed that the mean of our participants’ intensity of depression was only 8.10, which was a very low score and was considered to fall in the normal range (score 5-9). Thus, we could easily predict that it is difficult to reduce these low-intensity-depression participants’ negative affect to a further lower level, even with the intervention of regular physical exercise. Perhaps, it would be better if participants with higher level of depression intensity were selected.

Perceived social support

Besides the increase in positive affect, the other important finding of this study was the significant increase in perceived social support from friends and significant others. As compared with the control group of this study, in which participants had social gathering with their friends, chatting,
gossiping and sharing mealtime with each other only instead of performing group physical exercise together, it was clear that the increase of perceived social support was not solely due to the presence of others or physically getting along with friends. Rather, the effect of group physical exercise does have the influence in it.

In addition, the result that the increase of perceived social support was come from friends and significant others but not the family was coherent to our experiment. As no family member was involved in this study, we could be more confirmed that the increase of resulted perceived social support was caused by the group physical exercise but not due to the confounding variable of family support in other aspects.

Group physical exercise versus social gathering

Social support refers to processes of interaction in relationships and social institutions that shore up coping, esteem, belonging, and competence through actual or predictable exchanges of tangible or psychological resources (Quinney, Gauvin, & Wall, 1992). In the experimental group, all participants took part in group physical exercise such as playing badminton, squash, tennis or table tennis. During these activities, participants needed to cooperate with and render mutual support to their fellow participants. Such group physical exercise involvement enables individuals to interact with peers, to participate in cooperative activity and to pursue competitive activity in a setting that is engaging and exciting.

The difference between a group physical exercise and a purely social gathering might be explained by the group cohesiveness, which is defined as a field of forces, deriving from the
attractiveness of the group and its members and the degree to which the group satisfies individual goals, and acts on the individual (Festinger, Schachter, & Back, 1950). Major reviews (e.g., Cartwright, 1968; Hogg, 1992; Lott & Lott, 1965) indicate that factors which increase interpersonal attraction (e.g., similarity, cooperation, interpersonal acceptance, shared threat) generally elevate cohesiveness. These factors are more likely appeared in group physical exercise than individual physical exercise and purely social gathering. The elevated cohesiveness produces improved intragroup communication, perspective taking, enhanced liking, recognition of similar interest, attitude and beliefs. If individuals share goals that require behavioral interdependence for their achievement, just like the condition under group physical exercise, they would like to join together strongly to get things done that they cannot do on their own (Sherif, 1966), such as gaining the mutual positive support, the pleasure of affiliation to avoid loneliness (Peplau & Perlman, 1982), and the emotional support in times of stress (Lewis, 1969).

Practical implication

It is no doubt that social support and positive affect are beneficial to us in physiological and psychological aspects as mention above. Regarding the results of our study, it is worthwhile developing more programs involving regular physical exercise for people in school settings, in commercial organizations or in the community, in order to improve students’ , staff’s and citizens’ perceived social support and positive affect. From one of the essential and impressive results of our study, it is also recommended to promote group physical exercise instead of individual exercise such as aerobic exercise or jogging, in which the increment of perceived social support might not be salient
without the element of social interaction with fellow participants. Another important result of this study is that significant other was proved to be the sources of social support in group exercise as well. Few of the instruments evaluate social support from a significant other, but MSPSS does illustrate this function. Terms used to describe sources of social support in MSPSS were specifically designed to allow respondents to interpret items in ways most relevant to themselves. For example, “a special person” used in MSPSS to measure support from a significant other could be interpreted variously to mean a boyfriend/girlfriend, teacher, counselor, etc. From this result, utilizing group physical exercise in programs involving participants and their significant others other than friends, such as coach, teacher or counselor, could also be considered in school settings, commercial organizations or our community.

Limitation

The implications above must be tempered by recognition of limitations of the research. Participants’ anxiety level, intensity of depression and degree of negative affect did not show significant decline with the intervention of regular physical exercise in our study, which contradict with the results of past research. This might be due to the small sample size (n=20 for each group) of this research. It is also possible that the base scores of participants’ initial depression intensity were too low and the participants’ depression conditions were considered to be normal, so no reduction in BDI score is expected.

Besides, we have used the same questionnaire for the pre-test and post-test. The short time interval (3 weeks in this study) between the pre-test and post-test might affect the results as the
participants might remember the answers of the pre-test. For example, Beck et al. (1961) did not recommend conventional test-retest reliability for his original measures for the BDI. Beck suggested that if the BDI was re-administered within a short interval then scores could be spuriously affected due to memory factors. If the test was re-administered after a long interval then consistency would be lower due to the intensity of depression. In conclusion, the failure to obtain significant change in depression intensity, anxiety level and negative affectivity might be due to the small sample size, low initial depression intensity or the re-administering problem of BDI.

In light of these limitations, a larger sample size is recommended, and those with low level of depression intensity should be screened out in future work of similar topic. Also, besides the self-reported inventory, observation by researchers or rated by significant others of the respondents should also be considered as a mean of getting more accurate data.

Future research

In conclusion, regular physical exercise was shown to help increase the degree of positive affect as well as the perceived social support from friends and significant others. Since study of effects of group physical exercise on social support is such a new area that none of the previous researchers had done, future research on this topic is necessary to further support and confirm this new findings. If such causal relationship could be confirmed to be significant in the future, its implication would be so valuable in promoting social support, especially for depressed people who always self-withdraw themselves from their social network. Furhtermore, studies about the causal relationship between physical exercise and positive affect is still limited since most of current research focuses on the
reduction of negative affect only. Future research in this area is also recommended, so that physical exercise could be used not only to help the depressed people who usually possess little positive affect, but also serves as an effective means to promote positive psychological well-being and a preventive measure from psychopathological symptoms for normal people, because our study showed that the degree of positive affect enhanced even though our participants’ initial depression intensities were low.

Although the sample size is small, the present study showed an exciting result about the benefits of group physical exercise in perceived social support and positive affect improvement. Yet, the mechanisms of such improvement warrant further research. The mechanisms in between the effect of regular physical exercise on affectivity and social support are complicated and could not be explained by a single factor. The effects of participants’ motivation, perception of the activity, hope and personality were ruled out in this study, but there might be some other mediators involved. For instance, effects of physiological or other psychological factors such as self-efficacy might be another explanation of the improvement of positive affect physical exercise. Besides, perceived social support was proved to be associated with emotion too. In a study of patients with a chronic disease, those who perceived different types of social support as readily available had less anxiety and more positive affect as long as 1 year later (Sherbourne et al., 1990). Therefore, perceived social support might act as one of the mediators of physical exercise which help increase the level of positive affect in this study. From this point of view, it is difficult to conclude whether the physical exercise directly affects the positive affect, or affects the perceived social support and so influences the positive affect indirectly. Therefore, future studies examining the change of affect involving individual exercises such as aerobic exercise or jogging are suggested, so as to rule out the effect of perceived social support on the
affectivity. Simultaneously, as much past research about physical exercise focused on individual exercise only, more future research about group physical exercise is also essential to demonstrate whether group exercise and individual exercise show the equivalent benefit on participants’ psychological well-being.
Reference


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Appendix I

香港城市大學應用社會科學系

個人資料  （請選出適用者）

1. 姓名: _____________________  2. 姓別: □男 □女  3. 年齡: __________

4. 職業: _____________________  5. 收入: _____________________

6. 身高: ______________ cm  7. 體重: ______________ kg

8. 教育程度:

□讀書少於一年  □小學程度  □中學程度  □預科程度  □大專或以上

9. 婚姻狀況:

□未婚 □已婚 □同居 □離婚 □鳏 / 寡

10. 你有多久沒有做運動？

□ 少於一個月  □ 1-2 個月  □ 多於 2 個月，但少於 1 年  □ 1 年以上

11. 在過去三個月裏，你做運動有多頻密？

□ 每星期多於 2 次  □ 每星期 1-2 次  □ 兩個星期 1-2 次

□ 一個月 1-2 次  □ 一個月少於 1 次  □ 不適用

12. 過去三個月，你平均每次運動多久？

□ 少於 10 分鐘  □ 10-20 分鐘  □ 21-30 分鐘  □ 31-40 分鐘

□ 41-50 分鐘  □ 51-60 分鐘  □ 多於 1 小時  □ 不適用

MEDICATION HISTORY

Are you seeing any doctor currently?  Y / N  Type of doctor: ______________

PRIOR MEDICATION

List all prior therapy taken at any time during the past 2 years  None □  OR

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Total daily dose (mm/dd/yy)</th>
<th>Start Date (mm/dd/yy)</th>
<th>Stop Date (mm/dd/yy)</th>
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</thead>
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<td></td>
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<td>/ /</td>
</tr>
</tbody>
</table>
CONCOMITANT MEDICATIONS

List all current therapy taken  None □      OR

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Total daily dose (mm/dd/yy)</th>
<th>Start Date (mm/dd/yy)</th>
<th>Stop Date</th>
</tr>
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</tbody>
</table>

Medical History: List all the past and current major medical events

CNS: ____________________________________________

Cardiovascular: __________________________________

Abdominal: ______________________________________

Respiratory: _____________________________________

Allergy:  For any kind of food  Yes □  No □  what kind: 

For any drugs  Yes □  No □  what kind: 

Any others: ______________________________________

Any previous or current deliberate self-harm tendency: Yes □  No □

Taking illegal drug experiences: Yes □  No □

PSYCHIATRIC HISTORY

Comment:  Yes □  No □
以下的句子是關於你在進行這個活動時的經驗。請回應所有項目。請用以下的標準作指標，在每一句指出最能代表你的答案。

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>非常不同意</td>
<td>頗同意</td>
<td>非常同意</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. 我相信進行這個活動對我是有價值的。______
2. 我相信我在這活動中是有選擇的。______
3. 進行這個活動時，我在想我有多享受這個活動。______
4. 我相信進行這個活動有助於改善集中力。______
5. 這個活動很有樂趣。______
6. 我想這個活動對自我改進是很重要的。______
7. 我非常享受這個活動。______
8. 我在這個活動裏真的沒有什麼選擇。______
9. 我進行這個活動是因爲這是我想做的。______
10. 我認為這是一個很重要的活動。______
11. 進行這個活動時，我感覺我是享受這個活動的。______
12. 我認為這個活動非常沉悶。______
13. 這個活動有可能改善我的學習習慣。______
14. 我覺得我是沒有選擇的，但我還是要進行這個活動。______
15. 我認為這個活動十分有趣。______
16. 我願意再次進行這個活動，因爲我覺得這個活動是有用的。______
17. 我會形容這個活動是很令人享受的。______
18. 我覺得我需要進行這個活動。______
19. 我相信進行這個活動對我有益。______
20. 我進行這個活動因爲我需要這樣做。______
21. 我相信進行這個活動能幫助我在學校裏做得更好。______
22. 進行這個活動時，我覺得我是有選擇的。______
23. 我會形容這個活動是充滿樂趣的。______
24. 我覺得這個活動不是我自己的選擇。______
25. 因為這個活動對我有價值，所以我願意再次進行這個活動。______
請細心閱讀以下句子。請用以下的標準作指標，在每一句指出最能代表你的答案。

1=非常不同意  2=頗不同意  3=頗同意  4=非常同意

1. 我能想出很多方法來跳出困局。_____  
2. 我積極地追求我的目標。_____  
3. 我常常都覺得很疲乏。_____  
4. 任何問題都很多解決方法。_____  
5. 我很容易在爭執中感到受挫。_____  
6. 我能想出很多方法來得到我人生中很重要的東西。_____  
7. 我擔心自己的健康。_____  
8. 即使其他人感到灰心，我知道我能夠找到方法解決問題。_____  
9. 我過去的經驗能為我的將來做好準備。_____  
10. 我的人生已經過得很成功。_____  
11. 我經常發現自己為一些事情而擔憂。_____  
12. 我能達到自己訂下的目標。_____
BDI

以下問卷有二十題以四句為一組的敘述，請細讀每一組敘述句，然後自每組選出一句最能形容你在過去一星期（包括今天）的感受。請圈出句子旁的數字以表示你的選擇，如果一組敘述句中有超過一句適合你的敘述，請也一一圈上。請讀完每組四句才進行這一組敘述句的選擇。

1. 0 我不感到悲哀。
   1 我感到悲哀。
   2 我常常感到悲哀，而我又不能很快改變心情。
   3 我的悲哀和不快樂實難忍受。

2. 0 我對將來並不特別感到沮喪。
   1 我對將來感到沮喪。
   2 我感到我沒有什麼可以期待的。
   3 我感到將來是無望的，而且情形不會好轉。

3. 0 我不感到我是失敗者。
   1 我感到我比一般人更失敗。
   2 當我回顧一生，我可見的是很多的失敗。
   3 我感到我是一個完全失敗的人。

4. 0 我和以往一樣從各方面得到滿足。
   1 我不如以往一樣能有享受事物的樂趣。
   2 我再不能從任何事物得到真正的滿足。
   3 所有事物都使我感到厭煩和不滿。

5. 0 我不特別感到罪咎。
   1 有很多時間我感到罪咎。
   2 大部分時間我感到罪咎。
   3 任何時間我都感到罪咎。

6. 0 我不感到我正在被罰。
   1 我感到我會被罰。
   2 我意料我會被罰。
   3 我感到我正在被罰。

7. 0 我對自己不感到失望。
   1 我對自己失望。
   2 我討厭自己。
   3 我憎恨自己。

8. 0 我不感到我比別人差。
   1 我批評自己的弱點和錯誤。
   2 我常常責備自己犯錯。
   3 我因一切發生的事而責備自己。

9. 0 我沒有自殺的念頭。
   1 我有自殺的念頭，不過我不會實行。
   2 我想自殺。
   3 如果我有機會，我會自殺。

10. 0 我並不比平常多哭泣。
    1 現在我比以往多哭泣。
    2 現在我常常哭泣。
    3 以往我還能哭泣，不過現在想哭也不能了。

11. 0 我不比以前容易被激怒。
    1 我比平常較易被煩擾或激怒。
    2 現在我常常易被激怒。
    3 以往能激怒我的事物再也不能激怒我了。
<table>
<thead>
<tr>
<th>項目</th>
<th>評估</th>
<th>評估</th>
<th>評估</th>
<th>評估</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. 0 對其他人，我沒失去興趣。</td>
<td>1</td>
<td>對其他人，我比以前已較少興趣。</td>
<td>2</td>
<td>對其他人，我已失去大部份興趣。</td>
</tr>
<tr>
<td>13. 0 我和以前一樣能作出決定。</td>
<td>1</td>
<td>我比以前較多延遲作決定。</td>
<td>2</td>
<td>我比以前有更有困難去下決定。</td>
</tr>
<tr>
<td>14. 0 我不感到我的外表比以前差。</td>
<td>1</td>
<td>我擔心我看起來是老了或已沒有吸引力了。</td>
<td>2</td>
<td>我感到我的外貌有長久的改變，使我看來沒有吸引力。</td>
</tr>
<tr>
<td>15. 0 我能如以往一樣做事。</td>
<td>1</td>
<td>我需要更費力才能開始做一些事。</td>
<td>2</td>
<td>我需要強烈驅策自己才能做任何事。</td>
</tr>
<tr>
<td>16. 0 我能如平常一樣睡覺。</td>
<td>1</td>
<td>我睡得不如以往的好。</td>
<td>2</td>
<td>我比平常早醒一至二小時，而以後又難以再入睡。</td>
</tr>
<tr>
<td>17. 0 我不比平常易感到疲倦。</td>
<td>1</td>
<td>我比以往容易感到疲倦。</td>
<td>2</td>
<td>幾乎做任何事我都會感到疲倦。</td>
</tr>
<tr>
<td>18. 0 我食慾不比平常差。</td>
<td>1</td>
<td>我食慾不如以往的好。</td>
<td>2</td>
<td>現在我食慾比較差。</td>
</tr>
<tr>
<td>19. 0 近來我的體重沒有大減低。</td>
<td>1</td>
<td>我的體重減了五磅以上。</td>
<td>2</td>
<td>我的體重減了十磅以上。</td>
</tr>
<tr>
<td>20. 0 我不比平常多擔心我的健康。</td>
<td>1</td>
<td>我擔心我身體的問題，如疼痛、胃不適、或便泌。</td>
<td>2</td>
<td>我很擔心我身體的問題，因而很難去想其他的事。</td>
</tr>
</tbody>
</table>

我正在故意吃少些以減低體重。 □ 是 □ 否
以下是人們經常講述的一些狀況，閱讀每一種狀況，並在右邊那個符合你通常感受狀況的那個數字上打個圈。答案是沒有對或錯的。你不需要在任何一種狀況上花很多時間考慮，但是要圈出最能表達你平時一般感受的那個答案。

<table>
<thead>
<tr>
<th>狀況</th>
<th>從有經</th>
<th>總不時常</th>
<th>是</th>
</tr>
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<tbody>
<tr>
<td>1. 我感到愉快適意</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 我感到不安和神經過敏</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 我對自己感到滿意</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 我希望我能像別人那樣快樂</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 我好像感到有一種失落感</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 我感到安寧</td>
<td>1 2 3 4</td>
<td></td>
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</tr>
<tr>
<td>7. 我感到沉著冷靜，注意力集中</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. 我感到困難重重，不能克服</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. 我過多地擔憂那些實際上並不重要的事情</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. 我感到幸福快樂</td>
<td>1 2 3 4</td>
<td></td>
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<tr>
<td>11. 我的心情煩躁紛亂</td>
<td>1 2 3 4</td>
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<tr>
<td>12. 我缺乏自信心</td>
<td>1 2 3 4</td>
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<tr>
<td>13. 我感到安全踏實</td>
<td>1 2 3 4</td>
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<tr>
<td>14. 我容易地作出決定</td>
<td>1 2 3 4</td>
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<tr>
<td>15. 我感到力不從心</td>
<td>1 2 3 4</td>
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<tr>
<td>16. 我感到滿足自得</td>
<td>1 2 3 4</td>
<td></td>
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</tr>
<tr>
<td>17. 我腦海中湧現一些不重要的想法，煩擾著我</td>
<td>1 2 3 4</td>
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<td></td>
</tr>
<tr>
<td>18. 我感到極端失意，並難以把它排除</td>
<td>1 2 3 4</td>
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<tr>
<td>19. 我是一個堅強穩重的人</td>
<td>1 2 3 4</td>
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<tr>
<td>20. 當我仔細考慮目前的各種利害關係時，我陷入於緊張或混亂狀態</td>
<td>1 2 3 4</td>
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PANAS

這表內包含一些用來形容感受和情緒的字詞。閱讀各項，並在字詞旁邊的空位上記下最合適的答案。標示出過去2星期裏，你有以下表現的頻密程度。用以下的等級記錄你的答案。

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<td>極少或沒有</td>
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<table>
<thead>
<tr>
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<th>熱心</th>
<th>積極</th>
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</table>
Multidimensional Scale of Perceived Social Support-Chinese Version

請圈上你認為最能夠代表你的答案。

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</thead>
<tbody>
<tr>
<td>1</td>
<td>當我有需要時，身邊就有人幫我。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>有人與我分享快樂和悲傷。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>我的家人認真地設法幫我。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>我能在家中獲得所需要的精神上的支持及幫助。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>我有一位給我無限支持及安慰的人。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>我的朋友認真地設法幫助我。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>當事情出現問題時，我能夠倚靠／我的朋友。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>我能夠與家人傾談我的問題。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>我有一些能與我分享快樂和悲傷的朋友。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>在生命裡，我有一位關心我感受的人。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>我的家人願意協助我在事情上作決定。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>我能夠與朋友傾談自己的問題。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
請回答以下簡單的問題，以表示你現時的意見。請回答所有問題，並在每一題圈出一個答案。

你有沒有工作？ □ 有 □ 沒有

如果你的答案是「有」
1. 你對你的職業有多少興趣？
   3 – 非常
   2 – 普通
   1 – 少許
   0 – 沒有 ➔ 請去第 3 題

如果你的答案是「沒有」
2. 你對與居家生活有關的活動有多少興趣？
   3 – 非常
   2 – 普通
   1 – 少許
   0 – 沒有 ➔ 請去第 3 題

3. 當你從事你的職業或居家活動時，你是否：
   3 – 非常享受？
   2 – 有些享受？
   1 – 只有少許享受？
   0 – 沒有

4. 你對消閒活動或嗜好有多少興趣？
   3 – 非常
   2 – 普通
   1 – 少許
   0 – 不感興趣

5. 你空閒時間的素質：
   3 – 非常好？
   2 – 好？
   1 – 普通？
   0 – 不滿意？

6. 你有多頻密主動接觸你的家人（配偶、子女、父母等等）？
   3 – 非常頻密
   2 – 頻密
   1 – 甚少
   0 – 從來沒有
7. 你的家人的關係是：
   3 – 非常好？  2 – 好？
   1 – 普通？  0 – 不滿意？

8. 在你的家庭以外，你是否與人有關係或友誼？
   3 – 很多人？  2 – 一些人？
   1 – 只有幾個人？  0 – 沒有人？

9. 你有否嘗試與人建立關係？
   3 – 非常積極？  2 – 積極？
   1 – 普通積極？  0 – 不積極？

10. 大致上來說，你對你和其他人的關係的評分是：
    3 – 非常好？  2 – 好？
    1 – 普通？  0 – 不滿意？

11. 你會在你與他人的關係上附上甚麼價值？
    3 – 很大價值  2 – 有些價值
    1 – 只少許價值  0 – 全沒價值

12. 你的社交圈子的朋友有多經常聯絡你？
    3 – 非常多  2 – 經常
    1 – 甚少  0 – 從來沒有

13. 你有否遵守社會規範、禮儀、禮貌之類？
    3 – 任何時候  2 – 通常
    1 – 甚少  0 – 從來不會

14. 你參與社區生活（如社團，教會等）的程度是：
    3 – 充份參與  2 – 普通
    1 – 少許  0 – 完全沒有
15. 你是否喜歡搜尋有關事物、環境與及人物的資訊以改善你對它們的了解？

3 – 非常  2 – 普通
1 – 不多  0 – 完全沒有

16. 你是否對科學、技術、或文化的資訊有興趣？

3 – 任何時候  2 – 普通
1 – 只有少許  0 – 從來沒有

17. 你有多經常發覺向他人表達你的意見有困難？

0 – 任何時候  1 – 經常
2 – 有些時候  3 – 從來沒有

18. 你有多經常感到被你的圈子所拒絕或排斥？

0 – 任何時候  1 – 普通
2 – 有些時候  3 – 永遠沒有

19. 你認爲你的外貌有多重要？

3 – 非常  2 – 普通
1 – 不太  0 – 完全不

20. 在管理你的資源和收入方面你有多大困難？

0 – 任何時候  1 – 經常
2 – 有時  3 – 從來不會

21. 你是否感到能根據自己的願望及需要去安排你的境況？

3 – 非常  2 – 普通
1 – 不多  0 – 完全沒有
在這問卷內，你會找到一些人們用來形容他們對於事物的看法、意見、興趣及個人情感的句子。

每句句子能以 正確 “T” 和 錯誤 “F” 回答。閱讀每句句子，並選出最合適的答案。嘗試形容你通常或普通的舉動或感受，而不只是你現在的感受。

詳細閱讀以下各句子，但請不要花太多的時間去選擇答案。

即使你不是百分之百肯定，亦請你必須回答每句句子。

請謹記這些問題並沒有絕對對或者錯的答案，答案純粹形容你自己個人的意見和感受。

1. 儘管多數人認為這是浪費時間，我經常只是為了有趣和刺激而嘗試新事物。 T   F
2. 即使這些情況使多數人感到憂慮，我通常有信心每件事情都能順利發展。 T   F
3. 我經常覺得自己是環境因素的受害者。 T   F
4. 我通常能接納其他人，即使他與我非常不同。 T   F
5. 我享受向傷害我的人報復。 T   F
6. 我經常覺得自己的人生只有很少的目標和意義。 T   F
7. 我樂於幫助其他人找出解決問題的方法，使大家都能繼續前進。 T   F
8. 我雖完成的比我所做的更多，但我找不到有推動自己做得更多更好的理由。 T   F
9. 在不熟悉的環境下，即使其他人覺得這沒什麼值得憂慮，但我經常覺得緊張和憂慮。 T   F
10. 我做事時經常都沒有思考過往的經驗，只憑自己當時的感受。 T   F
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<tr>
<td>11.</td>
<td>與其迎合別人，我經常都用自己的方法做事。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>12.</td>
<td>在一般情況下，我不喜歡和我意見不同的人。</td>
<td>T</td>
<td>F</td>
</tr>
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<td>13.</td>
<td>即使會失去老朋友的信任，我仍會用所有合法的途徑去獲得財富和名聲。</td>
<td>T</td>
<td>F</td>
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<tr>
<td>14.</td>
<td>相比大多數人，我更保守和更有自制力。</td>
<td>T</td>
<td>F</td>
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<td>15.</td>
<td>與其把經驗和感受藏在心裏，我樂於和朋友公開地討論它們。</td>
<td>T</td>
<td>F</td>
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<td>16.</td>
<td>我比大多數人缺乏活力和更容易疲倦。</td>
<td>T</td>
<td>F</td>
</tr>
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<td>17.</td>
<td>我很少感到自己能自由地選擇想做的事。</td>
<td>T</td>
<td>F</td>
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<tr>
<td>18.</td>
<td>我經常體諒別人的感受如同體諒自己的感受。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>19.</td>
<td>我經常避免與陌生人來往，因爲我對陌生人缺乏信任。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>20.</td>
<td>我想盡可能討好別人。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>21.</td>
<td>我經常希望自己比任何人聰明。</td>
<td>T</td>
<td>F</td>
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<td>22.</td>
<td>即使其他人早就放棄了，我通常都能意志堅定地長時間做一件事。</td>
<td>T</td>
<td>F</td>
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<td>23.</td>
<td>我經常等待別人來爲我解決問題。</td>
<td>T</td>
<td>F</td>
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<tr>
<td>24.</td>
<td>我經常花錢至花盡所有金錢，以致負債累累。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>25.</td>
<td>當我放鬆的時候，我經常會有意想不到的了解和領悟。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>26.</td>
<td>我不太在意別人是否喜歡我或我的處事方式。</td>
<td>T</td>
<td>F</td>
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<td>27.</td>
<td>因爲不可能滿足所有人，所以我通常只嘗試去滿足自己的需要。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>28.</td>
<td>我沒有耐性對待那些不接納自己意見的人。</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>29.</td>
<td>我有時感到非常接近大自然，彷彿萬物都成爲一體。</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>
30. 當我與一群陌生人見面時，我通常比大多數人更害羞。 T F
31. 我比大多數人感性。 T F
32. 我像有「第六感」般，有時能使預知將會發生的事。 T F
33. 當有人傷害我，我通常會以牙還牙。 T F
34. 我的態度大多取決於自己無法控制的因素。 T F
35. 我經常希望我比每個人強。 T F
36. 在作決定前，我喜歡長時間思考事情。 T F
37. 我比大多數人更勤力。 T F
38. 在多數人都覺得危險的環境下，我通常都能保持鎮靜和感到安全。 T F
39. 我不認爲幫助弱者是明智的。 T F
40. 即使那些人曾不共平地對待我，我會感到不安假如我不公平地對待他們。 T F
41. 通常別人都會告訴我他們的感受。 T F
42. 我有時會感到自己是某些不受時間和空間局限和約束的東西的一部分。 T F
43. 我有時無法用言語解釋為何感到自己能與其他人心靈上有聯繫。 T F
44. 我喜歡那些沒有被嚴格的規則和法規所限而能做到自己想做的事的人們。 T F
45. 當與一群陌生人見面時，我大概能夠放鬆及友善地對待他們，即使我事先知道他們不太友善。 T F
46. 我通常比大多數人更擔心事情將會出錯。  T  F

47. 我通常會在作出決定前仔細思考事情的所有細節。  T  F

48. 我經常希望自己像超人一樣擁有特殊的力量。  T  F

49. 其他人過份地限制我。  T  F

50. 我喜歡與其他人分享我所學到的。  T  F

51. 我通常都能得到其他人的信任，即使我所講的話過於誇張和不實。  T  F

52. 我有時感到自己的生命像被一種超越自然的力量指引多於人為的因素。  T  F

53. 我被公認是一個非常實際並且不會感情用事的人。  T  F

54. 我非常容易受傷感的外表感動。（例：殘障兒童尋求幫助）  T  F

55. 我通常比其他人更賣力，因爲想盡可能把事情做得更好。  T  F

56. 我不太喜歡很多缺點的自己。  T  F

57. 我只有很少的時間去找出長遠的方法去解決自己的問題。  T  F

58. 我經常因爲不知所措而無法解決問題。  T  F

59. 我喜歡花錢而不喜歡儲蓄。  T  F

60. 我通常善於將事實伸延使故事變得有趣或用來作弄別人。  T  F

61. 假如我被弄得很尷尬或被嘲諷，我不耿耿於懷。  T  F

62. 我很難改變我做事的一貫作風，因爲這會使我變得緊張、勞累或擔憂。  T  F
63. 我通常需要一個很好的實際理由才會使我改變我做事的一貫作风。
   T    F

64. 即使每個人都覺得害怕，但我經常都能保持放鬆和無憂無慮。
   T    F

65. 我覺得傷感的歌曲和電影很沉悶。
   T    F

66. 環境因素經常使我做違背自己意願的事。
   T    F

67. 當其他人傷害我，我會以德報怨而不會報復。
   T    F

68. 我經常因太著迷於做一件事而在那一刻迷失，像脫離了時間和地點似的。
   T    F

69. 我不認為我有任何真正的人生目標。
   T    F

70. 我經常在不熟悉的環境下覺得緊張和憂慮，即使其他人覺得這是有沒有危險的。
   T    F

71. 我經常只憑本能或直覺去做事而不會周詳考慮。
   T    F

72. 其他人經常認為我非常獨立，因為我會按照他們的要求做事。
   T    F

73. 我經常感到我與其他人在我情感上和靈魂上有很強的聯繫。
   T    F

74. 我通常都試著將心比心從別人的處境考慮，使自己能更真切的了解他們。
   T    F

75. 原則問題如公平待遇和誠信在我生命中的某些層面中並不是扮演一個重要的角色。
   T    F

76. 我比大多數人更懂得省錢。
   T    F

77. 即使大多數人覺得這是不重要的，但我仍會堅持事情應該在明確和有秩序的情況下完成。
   T    F

78. 我幾乎在所有的社交場合都感到非常自信。
   T    F
79. 我的朋友認為很難了解我的感情，因爲我很少把自己的想法告訴他們。 T F

80. 我喜歡想像自己的敵人正在受苦。 T F

81. 我比大多數人有精力和不容易感到疲倦。 T F

82. 即使我的朋友告訴我事情將會順利進行，但我經常因爲擔憂而把正在做的事情停下來。 T F

83. 我經常希望自己比其他人強。 T F

84. 在一個小組裏，每個組員很難得到公平的待遇。 T F

85. 我不會違背我的做事方式而故意討好其他人。 T F

86. 我不會在陌生人面前感到害羞。 T F

87. 我花大部份時間去做我認爲是必須但並不是真的很重要的事情上。 T F

88. 我不認為關於宗教或道德倫理規範的對與錯在商業決策中有重要的影響。 T F

89. 我經常先把自己的判斷放在一邊以便更能了解別人的處境。 T F

90. 我有許多的習慣使我難以完成有意義的目標。 T F

91. 爲了令這個世界更美好，我有作一些個人的犧牲，例如阻止戰爭、貧窮和不公義的事情發生。 T F

92. 我寧願等待別人去擔當領導而將事情完成。 T F

93. 我通常能尊重別人的意見。 T F

94. 我人生中的重要目標強烈地影響我的行爲。 T F
95. 通常為別人的成功宣傳是愚蠢的。 T  F
96. 我通常喜歡保持冷靜和客觀使自己不受其他人影響。 T  F
97. 我會比大多數人更容易在看悲劇時落淚。 T  F
98. 我比大多數人更快地在輕微的疾病或壓力下復原。 T  F
99. 當我覺得我能逃避處分，我會經常不遵守規則和法規。 T  F
100. 在我能夠相信自己在很多誘人的場合不被引誘前，我需要更多練習來養成良好的習慣。 T  F
101. 我希望其他人能說少一點。 T  F
102. 每個人都應該被尊重和莊重地對待，即使他們像是不重要和不好。 T  F
103. 我喜歡很快地作出決定以便能繼續做該做的事。 T  F
104. 我通常自信能輕易地完成其他人認爲危險的事（例如在一條潮濕或結冰的道快速地駕駛汽車）。 T  F
105. 我喜歡發掘新方法去做事。 T  F
106. 我享受把錢存起來多於把錢花在娛樂或尋求刺激上。 T  F
107. 我曾有過一段與愛和靈魂力量接觸的個人經驗。 T  F
108. 我擁有過幾刻感到非常喜悅的時候，在那時，我突然清晰、深刻地感到自己與萬物融為一體。 T  F
109. 多數人比我更能隨機應變。 T  F
110. 我經常感到自己是靈性力量的一部份，這力量是所有生命倚賴的。 T  F
111. 即使和朋友在一起，我不太喜歡「打開」自己。 T F

112. 我認為自己的自然反應通常都能配合自己的原則和長遠目標。 T F

113. 我相信所有生命都依賴一種不能完全解釋的神靈的指示和力量。 T F

114. 很多時候當我注視一樣平凡的東西時，一些奇妙的事便會發生，我有一種感覺：我感到新鮮，像第一次看到它。 T F

115. 當我要做一些新的或不熟悉的事物，我通常會覺得緊張和擔憂。 T F

116. 我通常強迫自己直至筋疲力盡或嘗試做多於自己能夠做的。 T F

117. 即使我知道自己將會遭受嚴重的後果，但我的意志力弱得使我抵當不了任何強烈的引誘。 T F

118. 我討厭見到別人受苦。 T F

119. 當我失落時，我通常感到和朋友一起會比獨自一人較好。 T F

120. 我希望我有比其他人更好的外表。 T F

121. 我喜愛看春天繁盛開的程度有如我喜愛和老朋友重逢一樣。 T F

122. 我通常覺得艱難的情況是一種挑戰或機會。 T F

123. 與我有關係的人都要學習我的處事方式。 T F

124. 即使經過輕微的疾病和壓力後，我通常還是比大多數人更有自信和活力。 T F

125. 當沒有新的事情發生，我通常會開始尋找一些刺激或興奮的事。 T F