



ACUTE EFFECT OF BIRDWATCHING ON MOOD STATES OF SENIOR HIGH SCHOOL STUDENTS IN THE PHYSICAL EDUCATION SETTING

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Abstract

Aim. The primary purpose of the study was to know how birdwatching as a form of physical activity immediately affects the mood states of senior high school students, and figure out how effective birdwatching in moods improvement during physical education classes and other purposes. Researchers also aimed to investigate differences when compared to walking alone, and if gender affects these mood state differences.

Methods. Participants were forty-three (N=43) physically healthy students, clustered into Walking (W) and Birdwatching (Bw) groups, with treatments scoping walking session and walking with birdwatching respectively. Respondents accomplished the Abbreviated POMS questionnaire for 5 minutes, before and after interventions.

Results. It is found that the pre- and post-profile of Bw group exhibited significant reduction in Tension (TEN), Confusion (CON) and Fatigue (FAT) using the paired T test. However, using the Wilcoxon test, TEN and CON reductions were found significant. While the TMD mean score of Bw group exhibited reducing before-and-after movement, W group showed significant reduction in all 5 negative mood states after intervention. Analyzing effects on males and females, it is found that reduction in TEN is strong regardless of gender, while males exhibited significant decrease in CON using paired T test in the Bw group.

Conclusions. Results showed a significant decrease in TEN, CON and FAT scores among Bw Group in a senior high school physical education setting. Despite no significant change, TMD scores decreased after the 20-minute birdwatching activity with walk. Results of W group also validates previous investigations with significant decrease in all negative mood states and TMD.

Key words: outdoor recreation, mental health, environmental consciousness, adolescent wellness

Introduction

Modern students have been adapting the 21st century life differently with their mental health worsening through pressures of school work, peers and self-originated burdens. Psychological disturbance among late adolescents is eminent in the occurrence of social complications from this distress. Aside from social implications, impact leads back in school as academic performance is forfeited, extending this problem at home towards poor relationship situations in the family. The enormous factors involved in this problem instigated from their overall lifestyle as well, in the direction of the occurrence of this multifaceted mental disturbance. Behaviours in this age-group in school have been observed and factors have been investigated through studies. Anger of students, specifically in school for instance, showed a link with narcissistic personality and peer pressure through the peer pressure inventory and narcissistic personality inventory. With the use of product moment correlation, negative correlations with this problem however were found in quality parental

and adolescent relationship and school climate (Hernawati, Rahayu & Soejowinoto, 2015).

Depression and anxiety disorders, being a common health problem worldwide has becoming prevalent among adolescents in schools. There were rates of 5.67% for the depressive episode and 17.43% for broader definition of depressive symptoms according to one study (Magklara et al, 2015). Findings of the same research also found that 49.38% of with depressive episodes had at least a comorbid anxiety disorder and only 17.08% sought for clinical help. Other associative factors, particularly financial difficulties in the family showed a significant link with depressive symptoms (Magklara et al, 2015).

For senior high school students, in particular, presence of depressive symptoms adds burden to tasks in relation to career-pathing concerns. High reported depressive symptoms illustrate increased placement-related stress and expectations about future success leading to uncertainty to other factors. Females have higher depressive symptoms with 49.5%, compared to

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males with 40.6% as what the research has found in Turkey (Yildirim, Ergene & Munir, 2007). Mood disturbance has been a detrimental factor in the academic performance of senior high school students. A study has presented how significant the relationship of this disturbance with stress in the setting of school work (Kouzma & Kennedy, 2002). Disturbance and stress without treatment has seen to develop problems in adolescent wellness. In a span of a year, it is seen that mood disturbance leads to impaired social adaptive functioning, making early intervention by professionals vital for emotional and social health (Pan & Yeh, 2015). Contrary to mood disturbance is the level of self-esteem of students. Improving students' self-esteem may contribute as an intervention to this growing level of stress. Self-esteem has been proven to influence the moral development of senior high school students significantly (Thompson, 2010). Volume of tasks and volume of interests have been affecting late adolescents as well in the aspect of subjective stress and burnout for school work. Due to conflicting volume of tasks, stress towards school tasks is established, affecting the risk level for burnout (Kremer, 2016).

Mood States, Physical Activity and Recreation

Exercise and physical activity has been used not only as an adjunct treatment for degenerative diseases but helps in treating depression and anxiety as well (Carek, Laibstain & Carek, 2011). Previous investigations support this anti-depressive and anti-anxiety effects of exercise, and its mood enhancing mechanisms (Byrne & Byrne, 1993). Responses shown that physical activity is effective in improving mood of participants (Chase & Hutchinson, 2015), regardless of the type of exercise, from resistance, aerobic or leisure (Hull & Michael, 1995).

In an in-depth analysis of mood improvement in exercise, a study presented developments in terms of three mood states: vigour, fatigue and confusion. Improvements in vigour and fatigue were seen after 10 minutes of exercise, while some progressive improvements in confusion was found over 20 minutes. Total mood improvements occurred as early in the 10th minute of exercise and no additional improvements were revealed over longer periods of physical activity (Hansen, Stevens & Coast, 2001).

Achieving mood improvements through exercise may also entail improvements in one's Quality of Life (QoL). Mood states revealed a statistically significant relationship with domains of QoL, namely physical health, psychological health, and social relationships. Correlations between mood states and QoL domains with also showed gender-related differences. Males exposed mood

state relationship with social relationship and environmental health, while female mood states are correlated to physical and psychological health (Sichiri, et al., 2016). Mood states, which can be improved by exercise, also predicts performance outcome in sports. In the same meta-analysis done in 1995, effects on mood states are larger in sports that involve open skills with self-referenced criteria. While the Profile of Mood States can be a predictor of outcome, findings of the study do not suggest prediction of level of achievement (Beedie, Terry & Lane, 2000). Rarely used for mood improvements, exercise has shown to be operative in improving psychological health. This opens the idea of recreation playing greater responsibility for improvements in terms of mood and mental health. Outdoor recreation was investigated in a study, revealing a negative correlation with depression. Participants, comparing to nonparticipants, had lower overall depression scores, showing that the more an individual participate in outdoor recreation activities, the more it exhibited lower depression scores (Wilson & Christensen, 2012). Outdoor-related activities do not differ in terms of improvement in mood states when compared to other exercise methodologies. Anxiety showed to decrease the same way when rock-climbing as an activity is done. The difference in change in Vigour however, is decreasing for outdoor recreation participants, while increasing for fitness participants towards the end of the program (Gallotta, et al., 2015). The application of outdoor recreation to improve mood states has transcended from physical fitness purposes. Acute effects on both positive and negative mood states were observed and benefited groups with psychosocial needs. Improvements in positive mood states, coupled with significant reductions in anxiety, depression and stress is perceived to improve well-being of people suffering from PTSD, consistent with effects on normal population (Vella, Milligan & Bennett, 2013).

Birdwatching

With its growing popularity, birdwatching progressed from a simple reflective encountering of species to a more organized outdoor activity. It is known in different terms such as birding and bird walk, with skills ranging from just encountering and listening to produced sounds, to bird photography. The skilled practice involving listing of birds is coerced by the excitement of meeting and identifying bird species. However, this motivation is more than becoming familiar with its classifications but already involves physical skills of spotting these creatures (Wilkinson, Waitt & Gibbs, 2014). The reflective aspect of encountering birds can be related to the concept of "sense of tranquillity" in the study of Minami. It analyzed



how this concept affects the psychological state of high school students by raising plants inside the classroom. This form of nature-association leads to a higher sense of tranquillity among them (Minami et al, 2011). With birdwatching on the other hand, participants go out in the wild, apply the skills for the activity and feel nature. Going out suggests to be good physically and psychologically but environmental impacts as described by Kronenberg may be present in every birding sessions (Kronenberg, 2014). The risk of contribution to environmental impacts may exist. However, as participants enjoy the psychological tranquillity of being in nature, conservation potential is being developed with wildlife recreation. Findings have shown elevated rates of conservation behaviours among birdwatchers and wildlife recreationists (Cooper, et al., 2015). Having effects on humans, the activity reveals not only the relationship of the participant and practice, but also the connection of humans to nature. The impact of nature to humans brings out the issue of reasonable consumption to their consciousness (Watson, 2010; Paavola 2001; Jackson 2005; Kronenberg, 2007). This consciousness leads to perception of participants to their selves that influence them to participate more and introduce birding to others (Yang, 2016). Partaking in birdwatching differ in motives among participants. Male birders are inclined to participate for them to display their skills of encountering birds. Relevance is different among females where personal enrichment, enjoyment, satisfaction and recreation become the reason for doing the activity. Despite of the difference in styles, both male and female birders are serious about doing birdwatching (Lee, McMahan & Scott, 2015). With the rise of researches that involves environment conservation, little research was done on outdoor recreation and birdwatching as a physical activity. The objective of this study was to know the immediate effect of birdwatching as a form of physical activity on participant's mood states. Findings were seen relevant in achieving objectives in senior high school physical education and figure out how effective birdwatching in mood improvement for other purposes such as community development and disaster management. Researchers also aimed to know how different immediate effects when compared to walking alone, and if gender effect differences are present in terms of mood states. It was hypothesized that birdwatching may give positive effects in mood states comparable to other forms of physical activity. The study was limited to exploring the effects of birdwatching in terms of the psychological health effects of inexperienced physical education students, and not physiological and for motor skills benefits.

Methods

Participants. Forty-three (N=43) physically healthy, senior high school physical education students who are inexperienced birders participated in the study. They are composed of 27 males and 16 females, with mean age of 16.16 years. Participants were clustered into Walking Group (W) of 13 and Birdwatching Group (Bw) of 30 individuals. Among the Bw participants, 20 are males and 10 are females. Qualified respondents were enrolled physical education students of a private, senior high school, who are new to birdwatching activities.

Instrumentation

The researchers utilized an Abbreviated Profile of Mood States answerable in 5 minutes, validated by Grove and Prapavessis. It was shown that this modified form of the Profile of Mood States (POMS) questionnaire has acceptable psychometric properties, capable of giving valid data from a physical activity setting (Grove & Prapavessis, 1992). Like the classic POMS, the instrument measures seven mood states: 5 negative namely Tension (TEN), Anger (ANG), Depression (DEP), Confusion (CON) and Fatigue (FAT), and 2 positive subscales, Vigour (VIG) and Esteem-related Affect (ERA). Total Mood Disturbance (TMD) can also be calculated through the questionnaire by adding the negative and subtracting the positive subscales. The instrument was designed to acquire data based from the immediate sense of respondents, modified to include response for items such as Sex and Age.

Study Procedures

1. **W Group** – Treatment for W was done in the university where walking around the campus in a single file was implemented by participants for 30-40 minutes to maximize benefits of the exercise (Hansen, Stevens & Coast, 2001). The activity was done in the late afternoon, from 4pm-5pm in a dry tropical climate.
2. **Bw Group** – Treatment for Bw was done in the university where a 10-minute walk in a single file was executed by participants towards a woodland, preserved area in the campus. A 20-30-minute walk with wildlife encounter was done to maximize the activity (Hansen, Stevens & Coast, 2001). The activity was done in the late afternoon, from 4pm-5pm in a dry tropical climate.
3. **Mood States** – The Abbreviated POMS was facilitated at the start and at the end of intervention for both W and Bw. The 5-minute questionnaire was responded by the participants directly before the activity, and re-completed right after the treatment. The 5-minutes before and after collection was based on a similar study done regarding psychological well-being of students after physical activity (Rehor, et al., 2001).

Ethical Consideration.

The research was conducted in established educational settings, that involves normal educational practices, instructional techniques or methods. The researchers acquired consent from participants upon implementation of the questionnaire. Information obtained from the questionnaire was recorded in such a manner that human participants cannot be identified directly from the instrument. Participants were oriented on risks and other matters about the experiment.

Results

After the intervention, it was found that all negative mood states showed decreasing mean levels among participants in W group. There were 3.307 decrease in TEN, 1.846 in ANG, 3.692 in DEP, 3.538 in CON and 4.846 in FAT, as presented by Figure 1. With an increased value in ERA, TMD score resulted to a visually significant decrease of 16.69. While the ERA scores increased, VIG showed a reduction from a mean score of 9.77 to 8.46, noting that both ERA and VIG are positive mood states among the seven.

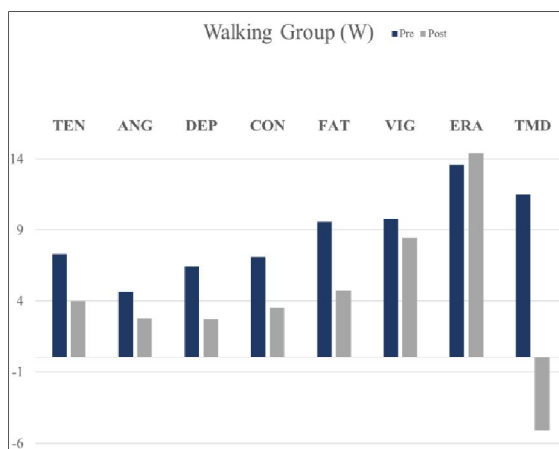


Figure 1. Comparing mean scores of mood states in W

Figure 1 also shows a negative mood disturbance scores resulted from a 30-minute walking session among participants.

In reference to the W group, Figure 2 shows a somehow related result with decreasing trend in most of the mood states. There were diminishing mean scores in the area of TEN, CON, FAT, VIG and ERA among Bw participants. TEN shows the biggest mean difference of 3.2 that contributed to

the 4.367 reduction in mean TMD. A relatively lower reduction in mean TMD compared to W group is instigated as well by reductions in positive mood states mean scores with mean VIG decreased to a score of 8.667 from 9.13 and mean ERA from 15.13 to 14.26. Contributed to this also is the increase in mean ANG score from 4.43 to 5.63. DEP also maintained its mean score contrary to the reduction trend of W group.

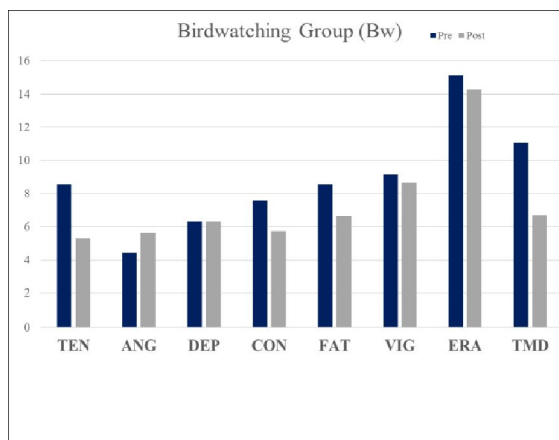


Figure 2. Comparing scores values of mood states in Bw

Table 1 shows that the decrease in all negative mood states among participants in W group is statistically significant at $p < 0.05$ using both paired t test and the analog Wilcoxon. These significant reductions reflected in the total disturbance scores as well of participants. Difference in pre- and post-test is seen lowest in ERA component.

Comparing pre- and post-test scores of Bw group participants, which shows significantly

correlated in all components as shown in Table 1, it shows that only TEN, CON and FAT only resulted to significant reductions in scores using the paired T test. Validation on the significant change in TEN and CON when Wilcoxon tests were run. Negative differences brought by the increase in ANG as a negative mood state and decrease in VIG as a positive mood state had a related z score with -0.82 and -0.81 respectively.

Table 1. Comparing pre- and post-tests within groups

	Walking Group (W)			Birdwatching Group (Bw)		
	t	z	r	t	z	r
TEN	3.70*	-2.81*	.77*	5.35*	-3.8*	.73*
ANG	2.94*	-2.32*	.88*	-1.47	-0.82	.68*
DEP	3.73*	-3.08*	.89*	.00	-0.39	.67*
CON	5.74*	-3.24*	.79*	2.88*	-2.52*	.74*
FAT	5.05*	-2.99*	.59*	2.09*	-1.8	.60*
VIG	1.18	-1.12	.65*	.69	-0.81	.63*
ERA	-0.72	-0.71	.44	1.51	-1.40	.68*
TMD	4.05*	-2.83*	.74*	1.16	-1.25	.73*

*significant ($p < 0.05$)

Analyzing gender-related differences on the immediate influence of birdwatching, Figures 3 and 4 show change in mean scores for male and female respondents. Male participants exhibited decreasing trend in mean scores for TEN, CON, FAT, VIG and ERA. TEN mean score decreased 3.15, CON with

2.05, FAT with 1.4, VIG having 0.7 and ERA having a 1.25 decrease. Increase in mean ANG score for males reached 1.6 while DEP mean score increased with 0.35 units. Despite this increase in both ANG and DEP, TMD resulted to a reduced mean score of 2.6.

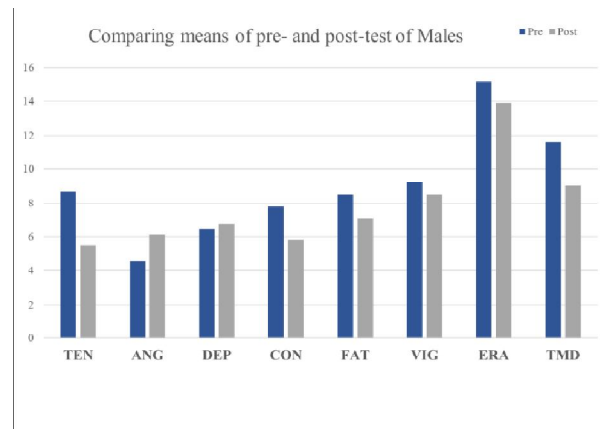


Figure 3. Comparing scores of male participants in Bw

Figure 4 shows decrease in mean TEN, DEP, CON and FAT scores of female participants in the Bw group after the intervention, with a 3.3, 0.7, 1.6 and 2.8 reduction respectively. On the other hand, an increase in mean ANG score were also

found, from 4.2 to 4.6. ERA slightly decreased 0.1 while VIG remained the same after the activity. Regardless of the increase in ANG, overall mood disturbance of females still decreased from 10 to 2.1.

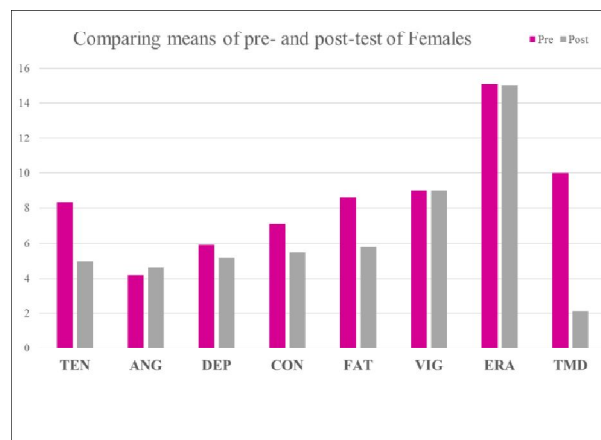


Figure 4. Comparing scores of female participants in Bw

Table 2 presents the statistical illustration of the change occurred from pre- to post-test scores of male and female participants from Bw group. Using the paired T test, it is found that the reduction in TEN and CON scores of male Bw participants are significant at $p < 0.05$. Significant decrease in TEN is also significant using the Wilcoxon test with a z score of -3.01. Pre- and post-test scores of males

are also found to be positively and significantly correlated.

The reduction in TEN after the birdwatching intervention is validated by the statistical figures derived from female raw scores. Both parametric and analog tools reveal that participants from the Bw group exhibited significant reduction in TEN regardless of the gender.

Table 2. Gender differences in Bw Group

	Males			Females		
	t	z	r	t	z	r
TEN	4.19*	-3.01*	.68*	3.19*	-2.26*	.81*
ANG	-1.52	-1.09	.63*	-.31	-.14	.76*
DEP	-.30	-.09	.67*	.41	-.56	.68*
CON	2.22*	-1.95	.63*	1.99	-1.70	.89*
FAT	1.31	-1.11	.62*	1.67	-1.54	.57
VIG	.77	-1.21	.53*	.00	-.06	.81*
ERA	1.76	-1.72	.62*	.10	-.17	.77*
TMD	.57	-.63	.72*	1.17	-1.13	.77*

*significant ($p < 0.05$)

Discussion

Exercise and its mood enhancement properties were validated in this study, within a specific age-group in a physical education setting. The consistency of result with previous studies (Byrne & Byrne, 1993; Beedie, Terry & Lane, 2000) is well presented as negative mood states significantly dropped in W group, regardless of intensity and type used (Hull & Michael, 1995). With a relative decrease in TEN and DEP, walking in physical education setting represents exercise as treatment for depression (Carek, Laibstain & Carek, 2011).

Overall mood improvements were found for both W and Bw Groups as what has found (Hansen, Stevens & Coast, 2001) when exercise is done for at least 10 minutes. This confirms a previous study (Gallotta, et al., 2015) regarding how outdoor activities are related to other exercise methodologies in terms of mood states improvement as both W and Bw programs possessed outdoor-related features.

The decrease in CON and TEN among males, and FAT and DEP among females may have connections with their social relationship, and physical and psychological health respectively as found in a previous study (Sichiri et al, 2016). The



decreasing depressing scores with outdoor recreation was only observed among females in the physical education setting, as what Wilson and Christensen (2012) found out. This increasing DEP scores among males may have links on previous findings (Lee, McMahan & Scott, 2015) regarding the competitive inclination of male birders in a novice skill set. Unlike males, females encounter birds for enjoyment and personal enrichment.

The significant decrease in TEN scores of both genders validates response to a higher sense of tranquility among participants (Minami et al, 2011) from the nature-association characteristics of birdwatching. Exposure to sounds, movements and natural habitat of birds highlights the reflective characteristic of the activity, acquiring as well its psycho-physio effects.

The decrease in TEN and TMD among senior high school participants may serve benefits especially in the problem of senior high school mood disturbance (Kouzma& Kennedy, 2002). With significant relationship of mood disturbance to stress, birdwatching in physical education may contribute to the stress management of senior high school students from school-related work. However, further studies are necessary to evaluate what classroom-related factors caused the increased ANG scores of inexperienced birders in physical education. Such factors may include the competitiveness of male participants, frustration out of low skills in encountering birds and other social factors among PE students.

Conclusions

After the intervention, results showed a significant decrease in TEN, CON and FAT scores of participants in the Bw Group in a senior high school physical education setting. Despite no significant change, TMD scores decreased after the 20-minute birdwatching activity with walk. Both genders exhibited significant decrease in TEN scores, however, only male participants significantly decreased in the CON subscale as an immediate effect from the activity.

Analysis with the W group validates previous researches on the acute effect of walking as an exercise to the mood states of participants. In the physical education setting, significant decrease in all negative mood states, and significant decrease in overall mood disturbance were found in participants who did the fitness walking activity. In relation to outdoor recreation done in a general set-up, birdwatching activity did not result to a significant decrease in DEP among inexperienced senior high school students.

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References

- Beedie CJ, Terry PC, & Lane AM, 2000, The profile of mood states and athletic performance: Two meta-analyses, *Journal of Applied Sport Psychology*, 12:1, 49-68, DOI: 10.1080/10413200008404213
- Byrne A, & Byrne DG, 1993, The effect of exercise on depression, anxiety and other mood states: a review. *Journal of Psychosomatic Research*, Vol. 37. No. 6, 565-574.
- Carek PJ, Laibstain SE, Carek SM, 2011, Exercise for the treatment of depression and anxiety. *Int'l. J. Psychiatry in Medicine*, Vol 41(1) 15-28. doi: 10.2190/PM.41.1.c
- Chase R, Hutchinson J, 2015, The effect of acute aerobic exercise versus resistance exercise on mood state. *Journal of Multidisciplinary Research*, Vol. 7, No. 2, 5-16.
- Cooper C, Larson L, Dayer A, Stedman R, Decker D, 2015, Are wildlife recreationists conservationists? Linking hunting, birdwatching, and pro-environmental behavior. *Jour. Wild. Mgmt.*, 79: 446-457. doi:10.1002/jwmg.855
- Gallotta MC, Emerenziani GP, Monteiro MD, Iasevoli L, Iazzoni S, Baldari C, Guidetti L, 2015, Psychophysical benefits of rock-climbing activity. *Perceptual And Motor Skills*, Vol 121 (3), 675-689. DOI:10.2466/30.PMS.121c26x9
- Grove JR, Prapavassis H, 1992, Preliminary evidence for the reliability and validity of an abbreviated Profile of Mood States. *International Journal of Sport Psychology*, 23, 93-109.
- Hansen CJ, Stevens LC, Coast JR, 2001, Exercise duration and mood state: how much is enough to feel better? *Health Psychology*, Vol 20(4), 267-275. <http://dx.doi.org/10.1037/0278-6133.20.4.267>
- Hernawati L, Rahayu E, Soejowinoto P, 2015, The predictors of Indonesian senior high school students' anger at school. *Journal of Education and Practice*, Vol 6 No 23, 108-119.
- Hull RB, Michael SE, 1995, Nature-based recreation, mood change, and stress restoration. *Leisure Sciences*, Vol. 17, Issue 1.



- <http://dx.doi.org/10.1080/01490409509513239>
- Jackson T, 2005, Motivating sustainable consumption. Sustainable Development Research Network, 29, 30.
- Kouzma NM, Kennedy GA, 2002, Homework, stress, and mood disturbance in senior high school students. *Psychological Reports*, 91(1):193-198. DOI: 10.2466/PRO.91.5.193-198
- Kremer I, 2016, The relationship between school-work-family-conflict, subjective stress, and burnout. *Journal of Managerial Psychology*, Vol 31(4), 805-819. <http://dx.doi.org/10.1108/JMP-01-2015-0014>
- Kronenberg J, 2014, Environmental impacts of the use of ecosystem services: case study of birdwatching. *Environmental Management*, 54: 617. doi:10.1007/s00267-014-0317-8
- Kronenberg J, 2007, Making consumption "reasonable". *J Clean Prod* 15:557-566. doi:10.1016/j.jclepro.2006.05.012
- Lee S, McMahan K, Scott D, 2015, The Gendered Nature of Serious Birdwatching. *Human Dimensions of Wildlife*, 20:1, 47-64, DOI:10.1080/10871209.2015.956375
- Magklara K, Bellos S, Niakas D, Stylianidis S, Kolaitis G, Mavreas V, Skapinakis P, 2015, Depression in late adolescence: A cross-sectional study in senior high schools in Greece. *BMC Psychiatry*, Vol 15, ArticleID: 199
- Minami M, Nishina H, Tsuzuki H, Takayama K, 2011, Analysis of the effects of placing or raising plants in the classroom on the psychological state of senior high school students. *Eco-Engineering*, 23(2):47-55. DOI:10.11450/seitaikogaku.23.47.
- Paavola J, 2001, Towards sustainable consumption: economics and ethical concerns for the environment in consumer choices. *Rev Soc Econ* 59:227-248. doi:10.1080/00346760110036175
- Pan P, Yeh C, 2015, Mood disturbance in adolescents screened by the Mood Disorder Questionnaire predicts poorer social adjustment. *Journal of Adolescent Health Care*, Vol 56(6), 652-657. <http://dx.doi.org/10.1016/j.jadohealth.2015.02.011>
- Rehor PR, Dunnagan T, Stewart C, Cooley D, 2001, Alteration of mood state after a single bout of noncompetitive and competitive exercise programs. *Perceptual and Motor Skills*, 93, 249-256
- Shichiri K, Shibuya M, Watanabe M, Tahashi M, Kaminushi K, Uenoyama T, Mashima I, Murayama K, Kuroda T, Suzuki Y, 2016, Correlations between the Profile of Mood States (POMS) and the WHOQOL-26 among Japanese University Students. *Health*, Vol. 8 Issue 5, 416-420.
- Thompson M, 2010, Context, moral orientation and self-esteem: impacting the moral development of senior high school students. *IFE Psychologia: An International Journal*, Vol 18, Issue 2, p150-169.
- Vella EJ, Milligan B, Bennett JL, 2013, Participation in outdoor recreation program predicts improved psychosocial well-being among veterans with post-traumatic stress disorder: a pilot study. *Military Medicine*, 178, 3:254-260. doi: 10.7205/MILMED-D-12-00308
- Watson GPL, 2010, Multiple acts of birding: the education, ethics and ontology of bird watching in Ontario. Ph.D. thesis, York University
- Wilkinson C, Waitt G, Gibbs L, 2014, Understanding place as 'Home' and 'Away' through practices of bird-watching. *Australian Geographer*, Vol. 45, No. 2, 205-220, <http://dx.doi.org/10.1080/00049182.2014.899029>
- Wilson JF, Christensen KM, 2012, The relationship between outdoor recreation and depression among individuals with disabilities. *Journal of Leisure Research*, Vol.44 Issue 4, 486-506.
- Yang S, 2016, Ode to joy: Sound that alters perceptions of birdwatching as a leisure pursuit. Kent State University / OhioLINK. http://rave.ohiolink.edu/etdc/view?acc_num=kent1468601951
- Yeung RP, 1996, The acute effects of exercise on mood state. *Journal of Psychosomatic Research*, Vol.40, No.2, 123-141
- Yildirim I, Ergene T, Munir K, 2007, High rates of depressive symptoms among senior high school students preparing for national university entrance examination in Turkey. *International Journal on School Disaffection*, Vol 4 No 2, p35-44.