

Article

Evaluating the Mental-Health Positive Impacts of Agritourism; A Case Study from South Korea

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Abstract: The stressful lifestyle of urban dwellers has increased the demand for green-based leisure activities; considering such growing demand, this paper investigated the potential mental health benefits of agritourism activities. The assessments were based on a questionnaire survey of two groups: visitors of agritourism sites around Seoul and a control group staying home ($n = 200$). In addition to measuring the participants' well-being level and stress level, they were also asked to self-estimate their immediate mood after their activities of the day. The analysis was conducted with R version 4.1.0 to explore the potential relationships and interactions between the activity of the day, perceived psychological factors, and the immediate emotional outcomes. Findings reveal that visitors to the agritourism sites perceived considerable improvement in their immediate mood compared to the control group who stayed home. Results indicate a significant interaction between self-reported wellbeing and agritourism activities and a combined effect on improved mood. Therefore, agritourism can potentially be a resource for a positive mood boost and improved mental health. The suggested practical implications can be applied as strategies to evoke the feeling of more connection to the agritourism activities and raise awareness of potential mental health outcomes.

Keywords: agritourism; mental health; farm tourism; psychological effects; mood boost



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1. Introduction

Fast-growing urbanisation has led to mental and physical health problems for city dwellers; its associated outcomes have turned green-based leisure activities into a necessity. Green-space exposure can play a crucial role in promoting the health and wellbeing of people [1]. It provides an opportunity for people to escape from their regular lives and stressful environments through engaging in outdoor activities [2]. It is believed that individuals living in areas with no green space may be more vulnerable to the negative impacts of stressful life events. The reason is that people have fewer opportunities for nature-based coping strategies than individuals living in areas with abundant green space [3,4].

There is evidence for a positive relationship between access to green or natural environments and people's perceived general health [5], mental health [6,7], physical health [8,9], social health [7,10,11], and it can even lead to an improved mood [12] or reduced stress and anxiety [6,7,13].

Most research on the outcomes of green-space exposure has investigated whether access and specific facilities are associated with wellbeing. In contrast, few studies have focused on the type of green space and how it can impact psychological mood and mental health. This paper addresses one particular form of green-based leisure activity, namely, 'agritourism'. It is a unique form of tourism activity, linked to ecotourism and rural tourism, involving both natural and cultural activities with a focus on sustainability.

There is little universal understanding of an agritourism definition. Disagreement exists regarding its characteristics and its boundaries [14]. It is accepted that this farm-based tourist experience has, however, played an innovative role in diversifying many farming businesses [15]. It involves farming-related activities and agricultural settings for entertainment or education on a working farm [16]. It is both a form of ‘supplementary business’ for farmers [17] and a new form of tourism [18]. Definitions of agritourism have been classified into three different perspectives: defining it as a component, or from the perspective of agricultural activity, or the development of rural communities [19]. Much depends on different combinations of key characteristics, the nature of the interaction between visitors and agriculture, and the level of experiencing authentic agriculture [20]. Two factors of ‘the authenticity of the activity’ and the ‘possible participation in agricultural life’ can differentiate authentic agritourism from other forms of rural tourism [21]. Chase et al. (2018) tried to classify and represent all the activities in agritourism in two main categories: core and peripheral activities. The classification was based on five criteria: direct sales, education, hospitality, outdoor recreation, and entertainment [21].

This study considers agritourism a unique ‘experience’ or ‘activity’ that can allow urban dwellers to participate and reconnect to nature through agriculture on a working farm [14,22]. Moreover, visiting rural green spaces gives a chance to forget the hectic urban life; it allows the tourist to focus on their own and society’s general wellbeing. Agritourism activities can provide the feel of connection with nature and offer visitors the nostalgia of a “quiet” traditional life [23].

1.1. Green Environments and Mental Health

Searching in green-based tourism journals, we found that much research has been conducted from different perspectives on this and related issues. Some studies explored broad perspectives of the impacts of rural tourism on quality of life [24,25] or on life satisfaction due to the holiday experience [26]. In contrast, some studies focused on specific tourism behaviour [25] or from the perspective of medical issue examinations [27,28]. The main focus, however, has been on outdoor activities emphasising personal growth and self-discovery [29].

It is essential to note the specific positive factors contributing to physical activity, social interaction, or a combination of different activities [30]. The health benefits can combine physiological and psychological health. Access, quantity, and types of green areas were mentioned as contributing factors to mental health benefits [31]. Three behavioural mechanisms have been involved [13]. The type of contact to the environment [11], the opportunity for social contact to improve mood and stress level [32], and the environmental design in creating conditions ‘attractive enough to recover from demanding situations of urban lifestyle’ [33].

Miller et al. (2008) investigated the contribution of parks and protected areas to human health and wellbeing. They classified the associated wellbeing as physical, mental, spiritual, social, and environmental, and in each context, they mentioned the relevant benefits at various levels [34,35]. Some studies mentioned the increased approval of nature protection by green spaces’ visitors [36,37]. Several studies revealed increased group cohesion [38,39] and more pro-social behaviour [40]. From the perspectives of the mental and spiritual benefits, the health effects of green resources tourism include the feeling of a more positive self-concept and increased self-esteem [41–43].

Two beneficial mental health effects were repeatedly mentioned: enhancement in wellbeing [30] and reduction in stress [13,44,45]. Two studies targeted children in their research. They found that the amount of nature in people’s environments had a strong relationship with depression and anxiety disorder and confirmed its impact on decreasing stress [46,47]. Thompson et al. confirmed the link between more green space and less stress in deprived communities [13] and social tourists who received financial support [48]. Similar results were found for young adults [35]. The quantity of visiting green spaces effective in the reported stress-related illnesses (the number of times people visit and the

duration of their park visits) [44] and the quality and success of a green-based program can increase self-efficacy, mindfulness, and subjective wellbeing. It may reduce feelings of time pressure and mental stress [35]. The positive contribution of green-based leisure time is important for both long vacations [24] and for short visits longer than 20 minutes [30].

Wendelboe-Nelson et al. (2019) investigated the context of green-space exposure and its association with mental health wellbeing through a scoping review approach. They note that different green spaces (e.g., recreational, residential, urban, or rural) may affect mental health well-being differently [49]. Therefore, studying agritourism as a new beneficial environment for mental health, with different functions and activities, might affect new contexts.

1.2. Mental Health: Well-Being, Stress

Based on the World Health Organisation (WHO) definition, mental health is not only the absence of mental disorders but also has a broader state of subjective wellbeing, comprising physical, mental, and social wellbeing factors. The WHO has emphasised the effective functioning of time spent in the countryside for both the individual and the community, allowing individuals to realise their abilities, cope with the everyday stresses of life, work productively and fruitfully, and contribute to their community [50]. Although the definition presented by WHO is still the main reference to describe mental health, there is no universal definition of mental health wellbeing, which makes it difficult for researchers in this subject. A review study on the wellbeing outcomes of green-space exposure suggested a definition of mental health wellbeing as a starting point in which wellbeing incorporates more social aspects and the potential of individuals rather than physical health [49]. There is also a translation problem; it is sometimes difficult to find an appropriate comparable synonym when wellbeing is translated into other languages [51].

In social and behavioural science, researchers need to prove reliability and validity when measuring mental health; therefore, it is recommended to apply the standard models [49].

Wellbeing can often be described in terms of happiness, which is a fundamental goal of society [52]. The literature on subjective wellbeing broadly differentiates long-term life satisfaction from short-term emotional wellbeing [35,53]. Stress, the other core variable in this study, is regarded as one of the most critical factors in evaluating mental health in modern society [44]. Stress is considered a type of adjustment activated by physical or psychological tensions [4]. Contact with nature and relieving stress has been practically shown to have a significant relationship [49]. However, there is no homogeneous result regarding green spaces and the mental health relationship [47].

Living conditions and environments support mental health, since these two factors allow people to adopt and maintain healthy lifestyles [40]. However, it is not easy to consider all the contextual factors that might affect mental health wellbeing outcomes due to the lack of information [49].

1.3. Agritourism in Korea

South Korea is a high per capita GDP country with a dynamic and flourishing economy; however, an unbalanced growth strategy was adopted to modernise the economy quickly. It seems that the achievements have been at a high cost to environmental health and the imbalance between urban and rural development [54]. Due to such rapid transformation, rural and urban areas suffered from socio-economic problems [55]. It led to high levels of stress and life dissatisfaction in the metropolitan area, especially among the young generation [56].

In the fourth national territorial plan (2000 to 2020), the government's main focus was to launch strategies that could eliminate gaps between urban and rural areas by diversifying rural economic activities, establishing a regional innovation system, and encouraging rural-urban interactions. Hence, the plan has been to develop rural areas through innovative activities, specifically, encouraging farm diversification through tourism activities. Farms

Tour appeared as a new concept, with activity farming-experience centres, restaurants, resorts, and accommodations for visitors. Later the new policy changed and focused on cooperation and community-based business. Nowadays, agritourism in South Korea includes cooperatively developed farm tourism by at least five households [57].

The government supports agritourism as a rural tourism project, especially “rural theme villages”, the promotion of organic farming, and encouraging engagement in harvesting events [52,58].

1.4. Stress in South Korean Society

In South Korea, suicide is one of the most common causes of death, seemingly linked to living in a high-stress society. It was estimated that 90% of people who committed suicide in 2016 had a diagnosable psychiatric illness, such as depression or anxiety, mainly caused by stress [59]. Surveys show that 56.5% of adolescents suffer from stress, and more than 2 million Koreans suffer from a major depressive disorder [56].

Given the contemporary situation in South Korea and the proven relationship between green-resources tourism with some aspects of mental health, it was hypothesised that:

- Agritourism activities might contribute to improve the immediate mood and further improve mental health.

To our knowledge, there has been no study to find evidence of the agritourism benefits of mental health. This research aimed to test which, if any, mental health benefits are related to agritourism experiences. Two dimensions of mental health were at the core of this research: perceived wellbeing and perceived stress. It was hypothesised that:

- There might be an interaction between self-reported wellbeing and agritourism.
- There might be an interaction between self-reported stress and agritourism.

2. Materials and Methods

2.1. Study Area

This study was conducted in 5 selected agritourism sites in the Seoul metropolitan area located in northwest South Korea. A population of about 25 million ranks it among the largest metropolitan areas in the world (website of the Seoul Metropolitan Government, 2020). This city was chosen because of its population density, and its hectic lifestyles. Citizens in Seoul often complain of their lack of adequate ‘time’ and ‘space’ for outdoor leisure activities.

Two types of agritourism sites are typical in South Korea. The first group mainly focus on non-agricultural activities for short-visit tourists, such as farm animals, and several associated entertainments are provided mainly for families with children. The second group comprises agricultural activities wherein the tourism facilities and activities are provided as supplements.

The first types were excluded, and among the second type of the available agritourism sites, the most visited sites (relatively) were found. To homogenize the selected study sites and to prevent site selection bias, we tried to consider several effective factors (49) as the inclusion criteria:

- Having easy access for visitors from Seoul city
- Being located out of the city area
- Providing both farming and leisure activities for visitors
- Providing both harvesting events and animal farms even on a small scale
- Also, we tried to select sites in different directions around the city of Seoul

The main agricultural activities on the selected sites were cultivating vegetables “(corn, tomato, cucumber, cabbage, tomato, etc.)”; animal farms concentrated on chicken and pigs. In addition, these sites comprised 1–4 small buildings, one or more pavilions for small social gatherings, and a large outdoor area. The other common point among all the sites was the managed and well-organized environment, which is likely to cause more interest in Korean culture. In addition, all the sites were working and managed on a small scale.

The main tourism activities offered in the selected sites were harvesting activities, such as pick your own services, farm-to-table meals (mainly barbeque and local vegetables), and animal feeding. Based on the authors' observation during the data collection, each site had 10–30 domestic visitors during the weekend (during the harvesting time).

2.2. Measures

Even though several behavioural and health variables have been involved in previous research on the relationship between nature and mental health, we decided to focus on wellbeing and stress since we found them relevant to Korean society. Both have been repeatedly tested in previous studies. The participants' feelings after agritourism were also asked the four questions about their 'present emotional state' mentioned below.

2.2.1. Perceived Stress

Perceived Stress (ST): Perceived stress was assessed with the Perceived Stress Questionnaire (PSQ) [60]. This instrument can subjectively measure experienced stress in multiple dimensions and is widely recognised in research on stress and well-being [61,62]. The PSQ items can be arranged into four subscales, including worry, tension, joy, and demand. In the context of the present study, the PSQ dimensions seem to be of relevance. For instance, the subscale "demand" refers to the external demands, such as time pressure and work overload [61], which is believed to be common in Korean society [63] (e.g., "You have too many things to do"; "You feel you're in a hurry"). Perceived stress was self-reported (during the last year or two) on four scales of 'almost', 'sometimes', 'often', and 'usually'.

2.2.2. Wellbeing

Well-being (WB): Searching the instruments developed to measure wellbeing, we found the WHO (Five) Wellbeing Index (1998 version) as the best to capture the intended attitude of the participants [64]. It measured perceived mental wellbeing during the last two weeks on a 6-point Likert scale (from 'all of the time', 5, to 'at no time', 0).

2.2.3. Present Emotional State

Present emotional state (PES): The post-experience questions captured the perceived state of the 'immediate mood'. It was measured with four general questions that referred to the respondent's present emotional state, 'How happy are you at this moment', 'How do you think today's experiences made you less stressed'. The other questions assessed the extent to which participants perceived agritourism activities/environment as mood boosting and if it had affected their present feeling and stress levels. It used a 5-point rating scale with higher values indicating greater happiness.

2.3. Sample and Study Design

The participants were 200 members of the community of the 'Global Agricultural Development Cooperation Center' in Seoul. The main role of this community is education in terms of agriculture, with different projects designed to motivate the members to engage in agri-oriented activities, mainly in rural areas. Several educational courses and practical projects are offered throughout the year. The main reason for selecting members of this community was that almost all are familiar with "green" activities. They were also interested in participating in agricultural activities and group-visiting farm areas.

After receiving permission from managers, lecturers were informed of the aim and procedure of research and were requested to announce this research and encourage the members to participate.

Members who agreed to participate sent an agreement letter to the corresponding author via email. The participants were informed briefly about the procedure. They agreed to travel to an agritourism site or stay at home for one day during weekends between July and October 2019. They had no choice to select one of the programs themselves; however, they were free to select the date based on their schedule. Therefore, the initial inclusion

criteria were: acceptance to spend one weekend day at home and having no particular plan or activity, except their daily routine with housework, and expressing their interest in participating in agritourism activities during the lecture.

After meeting those criteria, the lecturer provided a list of potential participants with their emails. A code was given to each email address, and performing 'randomisation', 200 coded-participants were allocated to two groups. Then, it proceeded through 'random blocking' in R software (version 4.1.0), using the 'agricolate' package.

First group: 'Visiting agritourism sites (Agrit-group)'

The members of this group were informed about their given plan via email. They were requested to select one day of a weekend (between the given months) to visit one of the selected agritourism sites around the Seoul metropolitan area and spend the whole day there. They were requested to stay on the site for more than 4 to 5 h to ensure that they had enough time to engage in the activities.

The participants in this group informed the authors about their schedule and their selected site to visit. One author also travelled to the same site on the same day to distribute and collect the questionnaires. Sampling took place on almost fully fair-weather weekends. Visitors were welcomed at the entrance door by the author. The same sampling effort was allocated to different sites. Participants were asked to complete the first part of the questionnaire before starting their activities on the site. This part of the questionnaire captured information on participants' socio-demographic information, as well as their perceived wellbeing and stress level, through two sets of 5 items and 30 items that included two standardised measures: the wellbeing index [64] and stress (PSQ) [60]. The author waited at the sites until the participants completed the site visit and their engagement in activities. They asked them to complete the second part of the questionnaire before their site visit in the morning. The respondents were asked to self-estimate their 'present emotional state'. The visitors did not have access to their pre-site visit responses when completing the post-site visit questionnaire.

Second group: 'Spending the weekend at home (Routine group)'

The members of this group were informed about the requested plan via Email, and they were asked to spend one day of a weekend at home (between the given months). All the selected participants were contacted via email in the early morning of the selected day for data collection and were given two hours to fill out the first part of the questionnaire, which was similar to the one given to the Agrit-group. To ensure consistency of understanding between participants, an explanation was provided in the email, and the direct contact number of one of the authors was provided in the case of having any inquiry.

Before the evening, a second email was sent to the participants. Just the same as the questionnaire for Agrit-group, the respondents were asked to self-estimate their 'present emotional state'.

Eliminating Bias

Various procedural remedies were utilised to control the risk of common method variance [65]. In the email sent to all the participants of both groups, it was mentioned that their information would be kept confidential, and they were informed that there were no right or wrong answers in the questionnaire. To ensure consistency of understanding between participants (in both groups), we explained what was meant by 'mental health'. Similar to Wolf and Wohlfart (2014), we clarified definitions of health vs. wellbeing for the participants following McGregorTan Research (2007) [1]. We defined wellbeing as mental health, and overall feeling as relating to mind, body, spirit, emotional state, and peace levels. Moreover, a self-administered manner was applied to filling in the questionnaires, which guaranteed anonymity.

Likewise, the data were gathered in two time periods, in the morning and evening. Such data collection practices are consistent with the suggested remedies for minimising common method bias on the association among the variables [65].

Even though it is believed that environmental and personal exposure to green space might impact the results, it is also suggested that including standardised quantitative data collection methods will allow a better understanding of the underlying factors (review). Therefore, in this study, we adopted randomisation to divide the participants into two groups of Agrit and control to have ideal homogenised participants in both groups and to adjust the impact of some confounding factors [35,49]. Additionally, it was reported that the study location, type of assessment, and type of exposure moderated nature's positive effects [50]; therefore in the current research, we tried to homogenise all those confounding factors for all the participants.

2.4. Analyses

Data from the questionnaire responses were analysed with R version 4.1.0. The first set of analyses involved a basic descriptive analysis of the demographic variables and the psychological measurements. The variables were compared, and *p*-values were reported to show the homogeneity of the factors for the two groups, Agrit and Routine. Pearson's correlation coefficients were also performed on all the involved variables.

In the second part of the analysis, several tests were conducted to address the research questions. The potential general effects of the activity of the day, demographic variables, WB, and ST on PES were tested through multivariate analysis of variance (MANOVA). Moreover, univariate analysis of variance (ANOVA) was performed to test the same effects on each item of PES separately. The reported Pillai's trace represented the percentage of the PES's variation determined by the independent variables.

Further, to measure the strength of the impacts, multiple linear regressions were conducted. The effects of the Agrit-group and Routine-group on PES were compared, and the represented amount of beta (regression coefficient) showed the strength of such difference. Similarly, the same method was performed on WB and ST to test the strength of their effects on PES. The score of WB and ST was calculated for each participant through the formula designed by the mentioned references [31,51]. Additionally, four items of PES were combined, and the strength of the effects was computed on all the items at once.

The third and final part of the analysis dealt with testing the interactions; Data were split into Agrit-group and Routine-group at this stage. Multiple linear regression tests were performed on those variables that had significant correlations in the Pearson correlations test. Accordingly, PES was considered a dependent variable, and the interactions effects of wellbeing and stress with the activity of the day were estimated.

3. Results

3.1. Measurement Results

Before any intervention, the demographic variables were adjusted to ensure their balance in both groups; it was required for performing randomisation. Moreover, by analysing the demographic variables, we found that samples were almost evenly represented by both genders, with an average age of 31–40. This age group had the highest percentage of the participant (28.5%), and it was followed by participants of the age group between 21–30 and then 41–50 (Table 1).

Later, Pearson correlation coefficients were performed between all the variables. The result indicated that, while WB and PES were significantly correlated for the Agrit-group, such correlations were insignificant for the Routine-group. However, ST did not present correlations with any of the variables.

Table 1. Demographic and psychological characteristics of participants in two groups of Agrit and Routine.

Factors	Total	Routine (<i>n</i> = 100)	Agrit (<i>n</i> = 100)	<i>p</i> Value
Age	<20	36 (18%)	17 (17%)	19 (19%)
	21–30	42 (21%)	18 (18%)	24 (24%)
	31–40	57 (28.5%)	31 (31%)	26 (26%)
	41–50	37 (18.5%)	15 (15%)	22 (22%)
	51–60	22 (11%)	14 (14%)	8 (8%)
	61–70	4 (2%)	3 (3%)	1 (1%)
	>71	2 (1%)	2 (2%)	0 (0%)
Gender	Female	98 (49%)	51 (51%)	47 (47%)
	Male	102 (51%)	49 (49%)	53 (53%)
WB	18.50 ± 3.53	17.54 ± 3.37	19.45 ± 3.44	<0.001
ST	76.23 ± 9.18	76.40 ± 7.41	76.06 ± 10.75	0.681
PES 1	3.54 ± 1.04	2.98 ± 1.03	4.10 ± 0.67	<0.001
PES 2	3.50 ± 1.12	2.86 ± 1.05	4.13 ± 0.76	<0.001
PES 3	3.33 ± 1.23	2.52 ± 1.06	4.14 ± 0.78	<0.001
PES 4	3.62 ± 0.93	3.13 ± 0.86	4.11 ± 0.72	<0.001
Total PES	13.98 ± 3.47	11.49 ± 2.48	16.48 ± 2.35	<0.001

3.2. Test of the Research Questions

To test if the activity of the day can contribute to an improved mood (PES), both MANOVA and ANOVA were conducted. The first test proceeded to calculate the general effects, while the second one tested the impact on each PES item separately. As represented in Table 2, the results of the multivariate analysis showed a significant effect of the activity of the day (Group: Agrit/Routine) on PES (Pillai's trace = 0.496, *p* value = 0.001). It implies that the effect size of the day's activity on improved mood is 0.496, or in other words, 49% of the PES's variation is determined by the activity of the day. Moreover, the ANOVA test showed significant effects of the variable Group on all the items of PES; thus, the Pillai's traces are acceptable.

Table 2. Evaluating the effects of different factors on PES based on the multivariate and univariate analysis of variance.

Effect	Multivariate Analysis		Univariate Analysis							
	Pillai's Trace	<i>p</i>	PES 1		PES 2		PES 3		PES 4	
			η ²	<i>p</i>	η ²	<i>p</i>	η ²	<i>p</i>	η ²	<i>p</i>
Group *	0.496	<0.001	0.261	<0.001	0.306	<0.001	0.397	<0.001	0.252	<0.001
Gender	0.018	0.511	0.003	0.491	<0.001	0.924	0.001	0.677	0.009	0.185
Age	0.192	0.116	0.029	0.597	0.076	0.037	0.06	0.115	0.035	0.467
WB	0.078	0.005	0.028	0.022	0.041	0.005	0.057	0.001	0.015	0.092
ST	0.038	0.131	0.002	0.581	0.028	0.022	0.006	0.293	0.007	0.261

* Group: represent the activity of the day (Agrit/Routine). η²: Partial Eta Squared. *p*: *p*-value.

Multivariate and univariate analyses were performed for WB and ST to test if the participants' well-being and stress levels could contribute to their improved mood. A significant effect was detected between WB and PES (Pillai's trace = 0.078, *p* value = 0.005). In other words, the effect size of WB on PES was 0.078, and it accounted for 78% of PES's variation. Besides, univariate analysis revealed that there is a significant effect of WB on three PES items. The *p*-value for the fourth item is borderline (*p* value = 0.092), which is considerable (Table 2).

However, the *p*-value was insignificant for ST, gender, and age. Therefore, the stress level of the participants and the mentioned demographic criteria have no effects on PES.

Given that the variables Group and WB have a significant effect on PES, the multiple linear regression method was performed to identify the 'strength' of the mentioned effects. The Routine-group was considered the baseline for the Agrit-group in testing the strength. The result revealed a significant 'difference' between the effect of agritourism-experience

and routine activity on PES. In fact, those participants who experienced agritourism scored the PES items higher than the control group, with significant p -values (Beta = 1.076, 1.229, 1.519, 0.955 for items 1 to 4, respectively) (Table 3). For instance, for PES 1, the beta score implies that the Agrit-group participants scored 1.076 higher than the control group participants.

Table 3. Using multiple linear regressions to estimating the regression coefficient (beta) of variables on PES items.

		PES 1		PES 2		PES 3		PES 4	
		B (95% CI)	p Value	B (95% CI)	p Value	B (95% CI)	p Value	B (95% CI)	p Value
Agrit-group		1.076 (0.813, 1.339)	<0.001	1.229 (0.96, 1.497)	<0.001	1.519 (1.247, 1.79)	<0.001	0.955 (0.716, 1.194)	<0.001
Gender	Male	0.089 (−0.165, 0.342)	0.491	−0.013 (−0.271, 0.246)	0.924	0.055 (−0.206, 0.317)	0.677	−0.155 (−0.385, 0.075)	0.185
	<20	−0.253 (−1.01, 0.504)	0.51	0.031 (−0.742, 0.803)	0.938	−0.506 (−1.286, 0.274)	0.202	−0.149 (−0.836, 0.539)	0.67
Age	21–30	−0.327 (−1.05, 0.395)	0.372	0.073 (−0.665, 0.81)	0.846	−0.544 (−1.289, 0.201)	0.151	0.008 (−0.648, 0.665)	0.98
	31–40	−0.112 (−0.828, 0.604)	0.758	0.095 (−0.636, 0.826)	0.798	−0.171 (−0.909, 0.567)	0.648	0.23 (−0.42, 0.88)	0.486
	41–50	−0.184 (−0.911, 0.543)	0.618	−0.259 (−1.001, 0.483)	0.491	−0.415 (−1.165, 0.334)	0.276	0.093 (−0.568, 0.753)	0.782
	51–60	−0.118 (−0.91, 0.673)	0.769	0.658 (−0.15, 1.466)	0.11	−0.405 (−1.222, 0.411)	0.329	0.15 (−0.569, 0.869)	0.682
	61–70	0.054 (−1.051, 1.16)	0.923	0.38 (−0.748, 1.509)	0.507	0.703 (−0.437, 1.843)	0.225	0.503 (−0.501, 1.508)	0.324
>71		0.915 (−0.501, 2.33)	0.204	−0.638 (−2.083, 0.807)	0.385	−0.244 (−1.703, 1.216)	0.742	0.541 (−0.744, 1.827)	0.407
WB		0.043 (0.006, 0.079)	0.022	0.053 (0.016, 0.091)	0.005	0.064 (0.026, 0.102)	0.001	0.029 (−0.005, 0.062)	0.092
ST		−0.004 (−0.018, 0.01)	0.581	0.017 (0.002, 0.031)	0.022	0.008 (−0.007, 0.022)	0.293	0.007 (−0.005, 0.02)	0.261
R ²		0.34		0.40		0.50		0.32	
Adjusted R ²		0.30		0.36		0.47		0.28	

B: Beta; Regression coefficient; CI: Confidence interval. The Routine group, female, age less than the previous levels were considered as the reference levels.

For testing the strength of the WB score on PES though, the calculation was different. First, we calculated the individual score of wellbeing for each participant based on the ‘WHO wellbeing test’ [31]. After that, multiple linear regression tests were performed to estimate how the wellbeing score changes affected PES scores. The presented beta for the effect of WB on PES in Table 3 shows that, with a one-point increase in the total wellbeing score, the score of PES-1 increased by an average of 0.043 (p value = 0.022). Such an effect was significant in other items with a regression coefficient of 0.053, 0.064, and 0.029. It implies a significant correlation between WB and PES, in which a higher wellbeing score can increase the PES score.

Having nominal regression coefficients for ST, age, and gender, it can be claimed that the changes within these factors will not predict PES scores.

Additionally, four items of PES were combined and computed to form a merged variable of total PES. Multiple linear regressions were conducted to estimate whether the involved variables will have similar effects on total PES. The result showed a significant effect of the group (Agrit/routine) on total PES (Partial Eta Squared = 0.493, p value = 0.001), and WB effect on total PES (Partial Eta Squared = 0.072, p value = 0.001). These two variables can potentially estimate the changes in total PES.

As in the reported results in Table 3, once again, the routine-group was considered the baseline. The differences between the Agrit-group and control groups were tested in terms of the score of total PES. As shown in Table 4, the reported PES by Agrit-group participants was averagely 4.779 units higher than the Routine-group (p value = 0.001). Besides, an increase in the ‘total WB score’ led to an increase in the perceived total PES by an average of 0.189 units (p -value = 0.001).

Table 4. Using multiple linear regressions to estimating the regression coefficient of variables on total PES.

Parameter		B (95% CI)	p Value
Gender	Male	−0.024 (−0.676, 0.628)	0.943
	<20	−0.877 (−2.824, 1.07)	0.377
age	21–30	−0.791 (−2.65, 1.069)	0.405
	31–40	0.042 (−1.8, 1.884)	0.964
	41–50	−0.766 (−2.636, 1.104)	0.422
	51–60	0.285 (−1.752, 2.322)	0.784
	61–70	1.641 (−1.204, 4.486)	0.258
	>71	0.574 (−3.068, 4.217)	0.757
	Agrit-group	4.779 (4.102, 5.456)	<0.001
WB		0.189 (0.094, 0.283)	<0.001
ST		0.028 (−0.008, 0.063)	0.130
R ²			0.57
Adjusted R ²			0.55

B: Beta: Regression coefficient; CI: Confidence interval. The Routine group, female, age less than the previous levels were considered as the reference levels.

3.3. Testing the Interactions

The final analysis estimated, the potential combined effects of the self-reported variables and the activity of the day. PES was considered a dependent variable. It was conducted by testing the effect of interactions in multiple linear regression models. Prior to calculating the interactions' effect, the Pearson correlations were analysed, and only the variables with significant correlations were involved in the interaction tests.

Testing the interaction effects on PES shows that significant interaction may arise when considering the relationship between self-reported wellbeing and agritourism with $\beta = 0.239$, p value = 0.014 (Table 5).

Table 5. Evaluating the interaction between the Agrit-group and wellbeing on total PES base on multiple linear regression.

Dependent Variable: PES		
Parameter	Beta (95% CI)	p Value
Intercept	10.267 (7.850, 12.685)	0.000
Agrit-group *	0.208 (−3.359, 3.776)	0.908
Wellbeing	0.070 (−0.066, 0.205)	0.311
Interaction of Agrit-group * and wellbeing	0.239 (0.049, 0.429)	0.014

* In comparison to the Routine group.

The results of the correlations and interactions tests are presented visually in Figure 1. It is clear that participation in agritourism and reported wellbeing can increase PES compared to the control group. Perceived PES was higher for Agrit-group members after spending a day on the farm and having agritourism activities (Figure 1A). In other words, the interaction of the reported wellbeing and agritourism has a combined effect on improved mood.

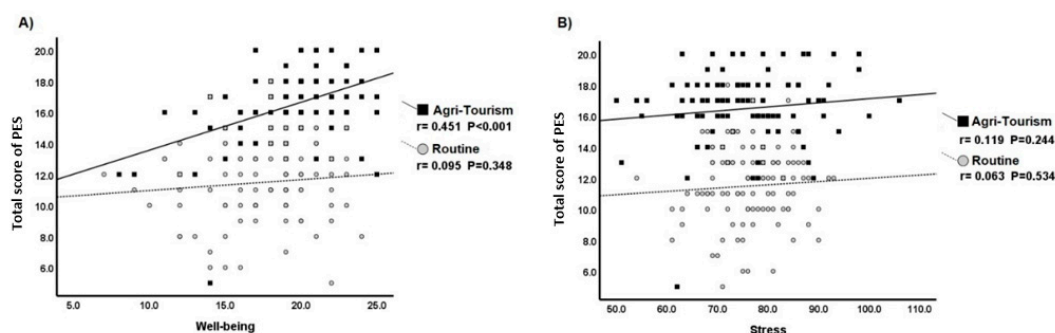


Figure 1. The correlation and interaction of wellbeing (A) and stress (B), with the activity of the day, on the total PES.

For the stress level, though, the parallel lines in Figure 1B represent no interaction effect of the reported stress level and the activity of the day on the PES.

4. Discussion

This paper studied agritourism as a new possibility for engaging in green space and the outdoors to improve wellbeing. The focus was on agritourism activities and its potential benefits on mental health, specifically the psychological aspects and its features in South Korea. The first strength of this study relates to the positive impact of agritourism activities on the perceived improvement of physiological health. Furthermore, the results are consistent with similar studies for experiences in a public green space or nature tracking activities [1,35,66].

First, we provide additional validation of the positive outcomes of green space exposure in terms of mental health. We show that agritourists perceived a considerable improvement in their immediate mood compared to the control group who stayed at home. It was claimed that engaging in outdoor and adventure activities will lead to positive outcomes, such as the reported improved mood after walking on a green path [12,66]. Our study adds to this claim and reports that, after the agritourism experience, the increase in the improved mood was significantly higher for the experimental group than for the control group. Such significant differences in the perception of PES between the Agri and Routine group adhere to the theory in which it was claimed that the “immediate social or physical environment” can influence personal perceptions [67]. However, several other factors might contribute to such a mood change after green-space exposure. For example, Bradley and Inglis (2012) argued that, in order to facilitate positive development and personal growth among the participants, leisure activities are better designed to be challenging and in a way that requires effort and skills [68]. Likewise, it was reported that increasing activity levels during hiking in nature could effectively improve health and wellbeing indicators [1]. In terms of agritourism, the weather, companions, level of engagement in the activity, and the nature of the activity might affect the outcomes as confounding variables. So, we tried to select homogenised sites and samples in this study. Nevertheless, our findings are consistent with research in a school project crossing the ALPs [35]. They pointed out that outdoor and adventure programs play an essential role in improving subjective wellbeing. Furthermore, they proved that such activities might reduce feelings of time pressure and mental stress. Moreover, a comparison between two gardening activities and reading showed that positive mood was significantly higher after gardening [4].

Second, having self-reported measures of stress and wellbeing, we found several interesting patterns in the data. Our findings affirm that the participants’ wellbeing perceptions can contribute to their agritourism experience and its associated outcomes. However, the findings do not lend any credence to such a contribution in terms of stress. Despite the fact that stress levels have been associated with green-based activities in other research [13,44]. Hence, such a result might suggest that agritourism experience may be related to the ‘perceived stress’ through different mechanisms.

Finally, a significant interaction was found between self-reported wellbeing and agritourism and a combined effect on improved mood. Accordingly, it seems that the positive mental health outcomes of agritourism can be increased with a higher perception of wellbeing. It was reported that a lower perception of wellbeing is attributed to depression and stress, whereas high levels are associated with enjoyment and happiness [69]. The result of the positive interaction between WB and agritourism adds to this claim.

4.1. Limitations

Though this study expands the existing knowledge base about the mental health outcomes of green-spaces exposure and literature, there are several limitations, and opportunities for further research remain.

First, the causal relationship is not easy to conclude due to various confounding variables in the social environment. Time-lagged designs are likely to provide some evidence for temporal causality; however, it is impossible to make assumptions of causality [69]. This study tried to report the potential relationship and not the order of causality among the involved variables.

Second, the variables of psychological health were measured based on self-reported data, which might cause bias. However, we applied standard measurement tools, and a detailed description of the study process is provided.

Third, it has been suggested to involve more demographic criteria and test them as control variables since the changes in the type of personal and environmental exposure to green space might impact the results [49]. Future research can involve control variables to ascertain whether they change the effects of agritourism on mental health. However, it is suggested that including standardised quantitative data collection methods will better understand the underlying factors [49]. Therefore, we applied this remedy to increase the credibility of the result.

Likewise, several confounding factors (from personal, social, and environmental aspects) might play a role in mediating the health effects of green space, and generalisations might not be accurate. For example, it is believed that both quantity and quality is important in terms of the outcomes of green-based activities [35,44], or population subgroups may benefit differently from exposure to green space, or a designed trend of intervention can be affected by environmental factors [49]. In fact, it is not clear if the improved mood is related to other confounding factors rather than the presence of the agritourism site. Even though some co-exposure factors were considered during the visit (such as duration of visit, environment, activities undertaken, and subjective feeling), various other factors could potentially mediate the results.

As a remedy for this main bias, randomisation was conducted to adjust some confounding variables on the selected participants in both groups. Randomisation can reduce selection bias and is a standard research design feature. We also tried to select similar agritourism sites to ensure participants' exposure to somehow similar environments and activities.

Fifth, it is not clear whether the beneficial health outcomes of agritourism were a short-term effect on mood or if they could last for a long time.

Testing the proposed relationships through cross-national data in future studies would present a picture of whether agritourists in different countries report the same outcomes of agritourism activities or not.

4.2. Practical Suggestions for Agritourism Development

The implications of this study are important to both policymakers and planners and to the owners of agritourism sites. We stress the need to promote agritourism sites, which can potentially lead to increased mental health in society. Such promotion can be implemented through three main policies: (1) raising the awareness on the mental health outcomes of agritourism, (2) encouraging people to visit and experience agritourism, (3) and designing the provided activities in a way that can evoke the visitors' psychological health.

To promote agritourism site visits, planners need to ensure that agritourism activities can address the needs of a broad range of visitors. Attention to biodiversity can be helpful [30]. Still, it is far more essential to design the activities and environment to motivate visitors from different social groups to visit and extend the length of their stay. Pre-organised and well-established events are required to increase the opportunities for engaging visitors in different activities. In practice that means encouraging visitors to engage in activities can potentially provide more opportunities for them to have nature-based coping strategies in their stressful lifestyles in cities. The spiritual outcomes would be through nature contacts and challenging activities, while the social outcomes would be through interactions in group activities. Likewise, attention to landscape designing might evoke satisfaction and assist mood-boosting, since it is believed that the landscape can promote mental, physical, and social wellbeing [70].

In order to raise awareness about the psychological benefits of agritourism in society, information can be imparted to the community via the national websites of both tourism services and of the health industry that connect outdoor activities with mental health outcomes. Moreover, designing child-appropriate activities will attract the attention of the whole family. The CDC's organisation emphasised encouraging children to engage in healthy outdoor activity and the critical role of communities, schools, and families in promoting such activities. In addition, agritourism programs can be integrated into the school curriculum, and the benefits of such a unique outdoor activity also can be stressed by pediatric health care providers [46]. Another practical suggestion is to engage school pupils in choosing some organic products for their school dining [23].

5. Conclusions

It can be concluded from the findings that visiting agritourism sites and engaging in the associated activities can improve the perceived immediate mood. In addition, perceived wellbeing might contribute to such immediate mood-boosting. There is a combined effect and positive outcomes of the interaction between wellbeing and agritourism. Therefore, it seems that agritourism as an emerging green-based activity can potentially contribute to improving mental health. The results add to a growing body of knowledge on the positive effects of green-space exposure on mental health. That body of knowledge is growing worldwide from Finland to Australia, not only in South Korea [71,72].

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