

# 大學生對PM<sub>2.5</sub>空氣污染的態度與認知之研究

謝百淇<sup>1</sup>、曾靜雯<sup>2</sup>、陳繼成<sup>3</sup>、吳景達<sup>4\*</sup>

<sup>1</sup>. 國立中山大學師資培育中心及氣膠科學研究中心副教授

<sup>2</sup>. 國立中山大學教育研究所碩士研究生

<sup>3</sup>. 國立中山大學教育研究所博士候選人

<sup>4</sup>. 國立臺灣師範大學環境教育研究所博士候選人

## 摘要

近年來，細懸浮微粒(PM<sub>2.5</sub>)空氣污染已成為全球關注的環境議題之一。本文目的為探討PM<sub>2.5</sub>空氣污染的議題中，不同性別、健康狀況、自然連結性及幸福感的大學生，其「對PM<sub>2.5</sub>的風險論點」、「對空氣污染防治的支持度」與「對PM<sub>2.5</sub>的認知」是否有所不同。研究針對臺灣三所大學共六個科系發放233份問卷，利用獨立樣本t檢定進行統計分析，茲將研究結果重點如下：(一)男性大學生對「風險不大」的論點平均得分比女性大學生較高。(二)自然連結性較高的大學生在「預防優先」與「利弊權衡」的論點上得分較高，反之較低的大學生則是在「相對風險」與「風險不大」的論點上得分較高。(三)自然連結性較高的大學生，普遍在「對空氣污染防治的支持度」上得分較高。(四)不同幸福感的學生在態度與認知上沒有明顯的差異存在。研究結果發現女性較男性大學生在意PM<sub>2.5</sub>的風險，自然連結性較高的大學生較重視空氣品質，並支持空氣污染預防優先和防治的態度。本研究的發現可提供給以環境議題為題材的大學環境教育之參考。

**關鍵字：**自然連結性、空氣污染、風險論點、細懸浮微粒、環境議題

---

投稿日期：2018年03月20日；接受日期：2018年08月02日

## 二、建議

本文依性別、健康狀況、自然連結性以及幸福感，探討大學生「對 PM<sub>2.5</sub> 的風險論點」、「對空氣污染防治的支持度」、「對 PM<sub>2.5</sub> 的認知」，依據本文研究結果及結論提出以下建議。建議大學可以實施環境教育課程或者跨學科課程，於專業領域課程中結合與貼近自然相關之活動教學設計，利用多元活動課程的模式，增進大學生與大自然連結；更透過潛在課程的影響，提高大學生自然連結性，進而使其傾向預防優先及利弊權衡之論點，且也較能增進對於空氣污染防治策略的高支持度，最終培育出針對空氣污染及 PM<sub>2.5</sub> 有較高認知，並具有預防與降低其影響的意識。此外高等教育端也可以結合地方辦理與自然環境相關之多元化活動或工作坊，透過與在地居民及社區互動，更可以直接或間接的達到環境教育宣導之目標，進而增進居民對於空氣污染議題認知。最後，建議大學生可以多貼近大自然環境，且主動增進空氣污染、PM<sub>2.5</sub>，甚至環境永續之相關議題知能，除了可以於空氣污染嚴重時具有自我保護之行為措施，更可以培養出對空氣污染具有獨立判斷思考能力，而增進空氣污染防治策略之支持度。

## 陸、誌謝

本研究的完成要感謝科技部經費補助(105-2511-S-110-001-MY4)、六班學生的全力配合以及中山大學氣膠科學研究中心的支持。

## 捌、參考文獻

- 王瑞庚 (2014)。細懸浮微粒 (PM<sub>2.5</sub>)：風險治理新挑戰。取自：  
<http://rsprc.ntu.edu.tw/zh-tw/m01-3/air-pollution.html>
- 【Wang, R. G. (2014). *Suspended particulates (PM<sub>2.5</sub>): new challenges in risk management.* Retrieved from <http://rsprc.ntu.edu.tw/zh-tw/m01-3/air-pollution.html>】

行政院環保署(2018)。相關詞彙及定義。取自：

<https://taqm.epa.gov.tw/taqm/tw/b0205.aspx>

【 Environmental Protection Administration, R.O.C. (Taiwan). (2018). *Related glossary and definition*. Retrieved from <https://taqm.epa.gov.tw/taqm/tw/b0205.aspx>】

任孟淵、許世璋(2015)。大學環境通識課群之教學內涵與成效分析。**環境教育研究**，11(2)，107-146。doi: 10.6555/JEER.11.2.107

【 Ren, M. Y. & Hsu, S. J. (2015). The Teaching Contents and Effects of Undergraduate Environmental General Courses. *Journal of Environmental Education Research*, 11(2), 107-146. doi: 10.6555/JEER.11.2.107】

沈廣城(2002)。國小學童環境知識、環境態度與環境行為之研究。未出版之碩士論文，國立屏東師範學院數理教育研究所，屏東。

【 Shen, K. C. (2002). *The study of elementary school students' environmental knowledge, environmental attitude and environmental behavior*. Unpublished master's thesis, Graduate Institute of Mathematics and Science Education, National Pingtung University of Education, Pingtung.】

余民寧(2015)。幸福心理學：從幽谷邁向巔峰之路。臺北市：心理出版社。

【 Yu, M. L. (2015). *Psychology of happiness: From languishing to flourishing*. Taipei: Psychological Publishing.】

周少凱、許舒婷(2010)。大學生環境認知、環境態度與環境行為之研究。**嶺東學報**，27，85-113。doi: 10.29850/LTJ.201006.0005

【 Chou, S. K., & Hsu, S. T. (2010). Research on college students' environmental cognition, environmental attitude and environmental behavior. *Ling Tung Journal*, 27, 85-113. doi: 10.29850/LTJ.201006.0005】

周儒、潘淑蘭、吳忠宏(2013)。大學生面對全球暖化議題採取行動之影響因子研究。**環境教育研究**，10(1)，1-34。doi: 10.6555/JEER.10.1.001

【 Chou, J., Pan, S. I., & Wu, H. C. (2013). Factors affecting college students to take action against global warming. *Journal of Environmental Education Research*, 10(1), 1-34. doi: 10.6555/JEER.10.1.001】

周桂田、杜文苓、王瑞庚、林怡均、王瑋彤(2016)。臺灣空氣污染之風險治理與制度研究。公共政策與法律研究中心研究計畫案期末報告(編號：CPPL104-08)。臺北市：國立臺灣大學公共政策與法律研究中心。

【Chou, K. T., Tu, W. L., Wang, D. W., Lin, J., & Wang, W. T. (2016). *Study on risk governance and regulatory institution of air pollutant in Taiwan* (No. CPPL104-08). Taipei: Center for Public and Law.】

兒童福利聯盟(2018)。2018 台灣家長空汙認知與兒童影響狀況調查報告。取自：  
<https://www.children.org.tw/research/detail/70/1330>

【Child Welfare League Foundation, R.O.C. (Taiwan). (2018). *2018 Investigation report on the awareness of children's air pollution and the influence of children in Taiwan*. Retrieved from <https://www.children.org.tw/research/detail/70/1330>】

香港健康空氣行動(2010)。問卷調查。取自：[http://hongkongcan.org/eng/wp-content/uploads/2010/10/SSP-Questionnaire\\_chi.pdf](http://hongkongcan.org/eng/wp-content/uploads/2010/10/SSP-Questionnaire_chi.pdf)

【Clean Air Network of Hong Kong(2010). *Questionnaire survey*. Retrieved from [http://hongkongcan.org/eng/wp-content/uploads/2010/10/SSP-Questionnaire\\_chi.pdf](http://hongkongcan.org/eng/wp-content/uploads/2010/10/SSP-Questionnaire_chi.pdf)】

洪榮昭、傅惠筠(2012)。大專校院學生節能減碳行為意圖之研究。*教育心理學報*，44(2)，373-388。doi: 10.6251/BEP.20120326

【Hong, J. C., & Fu, H. Y., (2012). A Study on the pro-environmental behavioral intention of post-secondary school students. *Bulletin of Educational Psychology*, 44(2), 373-388. doi: 10.6251/BEP.20120326】

洪蘭(譯)(2012)。快思慢想 (原作者：Daniel Kahneman)。台北市：天下文化。(原著出版年：2011)。

【Hung, L. (Trans.) (2012). *Thinking, fast and slow*. (Original author: D. Kahneman). Taipei: Commonwealth Publishing Group. (Original year of publication: 2011)】

陳康興(2005)。高屏地區大氣細微粒(PM<sub>2.5</sub>)特徵及來源分析研究。行政院環境保護署/國家科學委員會空污防制科研合作計畫成果報告(編號：NSC 94-EPA-Z-110-001)。臺北市：行政院國家科學委員會。

【Chen, K. S. (2005). *Characteristics and resource of fine particulates (PM<sub>2.5</sub>) in ambient air*

*in Kaohsiung-Pingtung area (No. NSC94-EPA-Z-110-001). Taipei: National Science Council.】*

許世璋(2003)。大學環境教育課程對於環境行動與其它環境素養變項之成效分析。*科學教育學刊*，11(1)，97-119。

【Hsu, S. J. (2003). The effects of an undergraduate environmental education course on environmental action and associated environmental literacy variables. *Chinese Journal of Science Education*, 11(1), 97-119.】

許世璋、任孟淵(2014)。培養環境公民行動的大學環境教育課程－整合理性、情感、與終極關懷的學習模式。*科學教育學刊*，22(2)，211-236。doi: 10.6173/CJSE.2014.2202.05

【Hsu, S. J. & Ren, M. Y. (2014). Environmental education courses promoting college students' environmental civic actions: A model based on learning processes in the patterns of the mind, heart, and soul. *Chinese Journal of Science Education*, 22(2), 211-236. doi: 10.6173/CJSE.2014.2202.05】

莊英慧、熊召弟、耿筱曾、甘漢銚(2007)。臺北縣國小六年級學童水的知識理解、水資源保育態度與行為之相關研究。*環境教育學刊*，7，55-79。

【Chuang, Y. H., Hsiung, Z. D., Geng, S. Z., & Gan, H. G. (2007). A research on the knowledge, attitudes and behaviors towards water resources amongst grade-six elementary school students in Taipei County. *Chinese Journal of Environmental Education*, 7, 55-79.】

莊秉潔(2011)。氣候變遷對於空氣品質影響評估 II。行政院環境保護署/國家科學委員會空污防制科研合作計畫成果報告(NSC 100-EPA-F-003-001)。臺北市：行政院國家科學委員會。

【Tsuang, B. J. (2011). *Climate change impacts on air quality of adaptation strategy in Taiwan* (No. NSC 100-EPA-F-003-001). Taipei: National Science Council.】

梁世武、劉湘瑤、蔡慧敏、方偉達(2013)。環境教育能力指標暨全民環境素養調查專案工作計畫。行政院環保署專案研究計畫成果報告(編號：EPA-100-EA11-03-A264)。臺北市：行政院環保署。

【Liang, S. W., Liu, S. Y., Cai, H. M., & Fang, W. D. (2013). *Environmental education*

- capability indicators and national environmental literacy survey project (No. EPA-100-EA11-03-A264). Taipei: Environmental Protection Administration.】
- 章英華、杜素豪、廖培珊(2010)。臺灣社會變遷基本調查計畫 2010 第六期第一次：環境組。臺北市：中央研究院社會學研究所。doi: 10.6141/TW-SRDA-C00221\_2-1
- 【Chang, Y. H., Tu, S. H., & Liao, P. S. (2010). *Taiwan Basic Survey of Social Change 2010, the first phase of the sixth period: Environmental group*. Taipei: Institute of Sociology, Academia Sinica. doi: 10.6141/TW-SRDA-C00221\_2-1】
- 陸洛(1998)。中國人幸福感之內涵，測量及相關因素探討。國家科學委員會研究彙刊：人文及社會科學，8(1)，115-137。
- 【Lu, L. (1998). The meaning, measure, and correlates of happiness among Chinese people. *Proceedings of the National Science Council, R.O.C., Part C: Humanities and Social Sciences*, 8(1), 115-137.】
- 黃政傑(1988)。臺灣地區國小、高中、大學學生環境意識之調查研究。行政院國家科學委員會專題研究計畫成果報告(NSC-77-0301-H-003-18)。臺北市：行政院國家科學委員會。
- 【Huang, C. J. (1988). *Investigation and research on environmental awareness of students in national primary, high school and university in Taiwan* (No. NSC-77-0301-H-003-18). Taipei: National Science Council.】
- 黃臺珠(編)(2014)。2012 年臺灣公民科學素養概況。高雄市：國立中山大學通識教育中心公民素養推動研究中心。
- 【Huang, T. C. (ed.) (2014). *Overview of Taiwan citizen science literacy in 2012*. Kaohsiung: National Sun Yat-sen University Center for General Education.】
- 郭維倫、陳韻如、蕭曉婷(2013)。市中心商業空間之生態心理學行為設境調查。科技部補助專題研究計畫成果報告期末報告(NSC102-2410-H-034-052-)。臺北市：行政院國家科學委員會。
- 【Kuo, W. L., Chen, Y. R., & Hsiao, W. T. (2013). *Investigation on the ecological psychological behavior of the commercial space in the city center* (No. NSC102-2410-H-034-052-).

Taipei: National Science Council.】

曾宇良、佐藤宣子(2012)。日本推動森林療育基地之過程與現況之研究-以九州為例。**林業研究季刊**，34(2)，161-172。

【Tseng, Y. L., & Sato, N. (2012). The development of forest therapy base and the current situation: The case of Kyushu Japan. *Quarterly Journal of Forest Research*, 34(2), 161-172.】

楊倍華(2008)。澎湖群島高中職學生環境素養調查與地方感影響分析。未出版之碩士論文，國立臺灣師範大學環境教育研究所，臺北市。

【Yang, P. H. (2008). *The survey and analysis of environmental literacy and sense of place of senior high school students in the Peng-Hu archipelago*. Unpublished Master's thesis, Graduate Institute of Environmental Education, National Taiwan Normal University, Taipei.】

潘淑蘭、周儒、吳景達(2017)。探究臺灣大學生環境素養與影響環境行動之因子。**環境教育研究**，13(1)，35-66。doi: 10.6555/JEER.13.1.035

【Pan, S. L., Chou, J., & Wu, C. T.(2017). Investigating Taiwanese university students' environmental literacy and factors influencing environmental action. *Journal of Environmental Education Research*, 13(1), 35-66. doi: 10.6555/JEER.13.1.035】

謝瑞豪、李睿桓、詹長權(2016)。台灣大氣中 PM<sub>2.5</sub> 污染濃度和汙染源的時空分布。**臺灣醫學**，20(4)，367-376。doi: 10.6320/FJM.2016.20(4).4

【Shie, R. H., Lee, J. H., & Chan, C. C. (2016). Temporal-spatial distribution of PM<sub>2.5</sub> concentration and the contribution of source in Taiwan. *Formosan Journal of Medicine*, 20(4), 367-376. doi: 10.6320/FJM.2016.20(4).4】

Bickerstaff, K. (2004). Risk perception research: socio-cultural perspectives on the public experience of air pollution. *Environment International*, 30(6), 827-840. doi: 10.1016/j.envint.2003.12.001

Bickerstaff, K., & Walker, G. (2001). Public understandings of air pollution: the 'localisation' of environmental risk. *Global Environmental Change*, 11(2), 133-145.

- Bonnes, M., & Nenci, A. M. (2002). Ecological Psychology. In S. Carta (Ed.), *Psychology, Volume III, Encyclopedia of Life Support Systems* (pp. 245-260). Oxford, UK: Eolss Publisher.
- Brink, P. T., Mutafoglu, K., Schweitzer, J. P., Kettunen, M., Clare, T. R., Baker, J., ... Ojala, A. (2016). *The health and social benefits of nature and biodiversity protection* (IEEP Report No. ENV.B.3/ETU/2014/0039). Retrieved from <http://ec.europa.eu/environment/nature/biodiversity/>
- Brook, R. D., Franklin, B., Cascio, W., Hong, Y., Howard, G., Lipsett, M., ... Tager, I. (2004). Air pollution and cardiovascular disease: a statement for healthcare professionals from the expert panel on population and prevention science of the American Heart Association. *Circulation*, 109(21), 2655-2671. doi: 10.1161/01.CIR.0000128587.30041.C8
- Brook, R. D., Rajagopalan, S., Pope, C. A., Brook, J. R., Bhatnagar, A., Diez-Roux, A. V., ... & Peters, A. (2010). Particulate matter air pollution and cardiovascular disease: an update to the scientific statement from the American Heart Association. *Circulation*, 121(21), 2331-2378. doi: 10.1161/CIR.0b013e3181dbece1
- Burek, K. (2012). *The impact of socioscientific issues based curriculum involving environmental outdoor education for fourth grade students*. Unpublished doctoral dissertation, University of South Florida, USA.
- Chawla, L., (1999). Life paths into effective environmental action. *The Journal of Environmental Education*, 31(1), 15-26. doi: 10.1080/00958969909598628
- Chou, W. C., Hsu, C. Y., Ho, C. C., Hsieh, J. H., Chiang, H. C., Tsou, T. C., ... Lin, P. (2017). Development of an in vitro-based risk assessment framework for predicting ambient particulate matter-bound polycyclic aromatic hydrocarbon-activated toxicity pathways. *Environmental Science & Technology*, 51, 14262-14272. doi: 10.1021/acs.est.7b02002
- Davis, J. L., Green, J. D., & Reed, A. (2009). Interdependence with the environment: Commitment, interconnectedness, and environmental behavior. *Journal of*

- Environmental Psychology, 29(2), 173-180.* doi: 10.1016/j.jenvp.2008.11.001
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49(1), 71-75.*  
doi: 10.1207/s15327752jpa4901\_13
- Dutcher, D. D., Finley, J. C., Luloff, A. E., & Johnson, J. B. (2007). Connectivity with nature as a measure of environmental values. *Environment and Behavior, 39(4), 474-493.* doi: 10.1177/0013916506298794
- Ferreira, J. G., & Venter, E. (2016). The interconnectedness between well-being and the natural environment. *Applied Environmental Education & Communication, 15(4), 291-300.* doi: 10.1080/1533015X.2016.1237902
- Gauderman, W. J., Urman, R., Avol, E., Berhane, K., McConnell, R., Rappaport, E., ... Gilliland, F. (2015). Association of improved air quality with lung development in children. *New England Journal of Medicine, 372(10), 905-913.* doi: 10.1056/NEJMoa1414123
- Health Effects Institute (2017). *A special report on global exposure to air pollution and its disease burden* (State of Global Air/2017). Retrieved from <https://www.stateofglobalair.org/>
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of Environmental Education, 18(2), 1-8.* doi: 10.1080/00958964.1987.9943482
- Hsu, C. Y., Chiang, H. C., Chuang, C. Y., Tsen, C. M., Fang, G. C., Tsai, Y. I., ... Chen, Y. C. (2017). Ambient PM<sub>2.5</sub> in the residential area near industrial complexes: spatiotemporal variation, source apportionment, and health impact. *Science of The Total Environment, 590-591, 204-214.* doi: 10.1016/j.scitotenv.2017.02.212
- Hungerford, H. R., & Volk, T. L. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education, 21(3), 8-21.* doi: 10.1080/00958964.1990.10753743
- International Agency for Research on Cancer (2013, October 17). *IARC: Outdoor air*

- pollution a leading environmental cause of cancer deaths.* Retrieved from [https://www.iarc.fr/en/media-centre/iarcnews/pdf/pr221\\_E.pdf](https://www.iarc.fr/en/media-centre/iarcnews/pdf/pr221_E.pdf)
- Institute for European Environmental Policy (2017). *Nature for health and equity*. Retrieved from <https://www.foeeurope.org/publications/>
- Kals, E., Schumacher, D., & Montada, L. (1999). Emotional affinity toward nature as a motivational basis to protect nature. *Environment and Behavior, 31*(2), 178-202. doi: 10.1177/00139169921972056
- Kardan, O., Gozdyra, P., Misic, B., Moola, F., Palmer, L. J., Paus, T., & Berman, M. G. (2015). Neighborhood greenspace and health in a large urban center. *Scientific Reports, 5*(1), 11610. doi: 10.1038/srep11610
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior. *Environmental Education Research, 8*(3), 239-260. doi: 10.1080/13504620220145401
- Kolstø, S. D. (2006). Patterns in students' argumentation confronted with a risk-focused socio-scientific issue. *International Journal of Science Education, 28*(14), 1689-1716. doi: 10.1080/09500690600560878
- Landrigan, P. J., Fuller, R., Acosta, N. J., Adeyi, O., Arnold, R., Baldé, A. B., ...Chiles, T. (2018). The Lancet Commission on pollution and health. *The Lancet, 391*(10119), 462-512. doi: 10.1016/S0140-6736(17)32345-0
- Liu, X., Zhu, H., Hu, Y., Feng, S., Chu, Y., Wu, Y., ...Lu, Y. (2016). Public's health risk awareness on urban air pollution in Chinese megacities: The cases of Shanghai, Wuhan and Nanchang. *International Journal of Environmental Research and Public Health, 13*(9), 845. doi: 10.3390/ijerph13090845
- Mayer, F. S., & Frantz, C. M. (2004) The connectedness to nature scale: a measure of individuals' feeling in community with nature. *Journal of Environmental Psychology, 24*(4), 503-515. doi: 10.1016/j.jenvp.2004.10.001
- Miller D., & Morrice J. (eds.) (2014). *GreenHealth: Contribution of green and open space to public health and wellbeing*. Aberdeen, UK: James Hutton Institute.

- Nisbet, E. K. L., Zelenski, J. M., & Murphy, S. A. (2009). The Nature relatedness scale: Linking individuals' connection with nature to environmental concern and behaviour. *Environment and Behavior, 41*(5), 715-740. doi: 10.1177/0013916508318748
- Nisbet, E. K., & Zelenski, J. M. (2013). The NR-6: A new brief new measure of nature relatedness. *Frontiers in Psychology, 4*, 813. doi: 10.3389/fpsyg.2013.00813
- Omanga, E., Ulmer, L., Berhane, Z., & Gatari, M. (2014). Industrial air pollution in rural Kenya: community awareness, risk perception and associations between risk variables. *BMC Public Health, 14*(1), 377. doi: 10.1186/1471-2458-14-377
- Palmer, J. A., & Suggate, J. (1996). Influences and experiences affecting the pro-environmental behaviour of educators. *Environmental Education Research 2*(1), 109-121. doi: 10.1080/1350462960020110
- Pluhar, Z. F., Piko, B. F., Kovacs, S., & Uzzoli, A. (2009). "Air pollution is bad for my health": Hungarian children's knowledge of the role of environment in health and disease. *Health & Place, 15*(1), 239-246. doi: 10.1016/j.healthplace.2008.05.005
- Ole, R. N., Zorana J. A., Rob B., Evangelia S., Massimo, S., Gudrun, W., ...Gerard, H. (2013). Air pollution and lung cancer incidence in 17 European cohorts: prospective analyses from the European Study of Cohorts for Air Pollution Effects (ESCAPE). *The Lancet Oncology, 14*(9), 813-822. doi: 10.1016/S1470-2045(13)70279-1
- Russell, J. A., & Pratt, G. (1980). A description of the affective quality attributed to environments. *Journal of Personality and Social Psychology, 38*(2), 311-322. doi: 10.1037//0022-3514.38.2.311
- Schultz, P. W. (2002). Inclusion with nature: Understanding human-nature interactions. *Psychology of Sustainable Development, 61*-78. doi: 10.1007/978-1-4615-0995-0\_4
- Seligman, M. E., & Csikszentmihalyi, M. (2000). Special issue on happiness, excellence, and optimal human functioning. *American Psychologist, 55*(1), 5-183.
- Tanner, T. (1980). Significant life experiences: A new research area in environmental education. *The Journal of Environmental Education 11*(4), 20-24.

doi: 10.1080/00958964.1980.9941386

World Health Organization [WHO] (2009). *Global health risk: mortality and burden of disease attributable to selected major risks*. Retrieved from

[https://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](https://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf)

Wright, B. D., & Masters, G. N. (1982). *Rating scale analysis*. Chicago, IL: MESA Press.

Zelenski, J. M., & Nisbet, E. K. (2014). Happiness and feeling connected: The distinct role of nature relatedness. *Environment and Behavior*, 46(1), 3-23. doi: 10.1177/0013916512451901

**作者簡介：**

謝百淇 國立中山大學師資培育中心及氣膠科學研究中心副教授

電話：07-5252000 Ext. 5888

電子郵件：[pshein@mail.nsysu.edu.tw](mailto:pshein@mail.nsysu.edu.tw)

通訊處：804 高雄市鼓山區蓮海路 70 號

曾靜雯 國立中山大學教育研究所碩士研究生

電話：07-5252000

電子郵件：[laco1105@gmail.com](mailto:laco1105@gmail.com)

通訊處：804 高雄市鼓山區蓮海路 70 號

陳繼成 國立中山大學教育研究所博士候選人

電話：07-5252000

電子郵件：[runrice@hotmail.com](mailto:runrice@hotmail.com)

通訊處：804 高雄市鼓山區蓮海路 70 號

吳景達 國立臺灣師範大學環境教育研究所博士候選人

電話：04-23226940 Ext. 670

電子郵件：[clement670.ctw@gmail.com](mailto:clement670.ctw@gmail.com)

通訊處：404 台中市北區館前路一號

**Shein, Paichi Pat**

Associate Professor, Center for Teacher Education and Aerosol Science Research Center, National Sun Yat-sen University

Tel: 07-5252000 Ext. 5888

E-mail: pshein@mail.nsysu.edu.tw

Address: 70 Lienhai Rd., Kaohsiung 80424, Taiwan, R.O.C.

**Tseng, Ching-Wen**

Graduate student, Institute of Education, National Sun Yat-sen University

Tel: 07-5252000

E-mail: laco1105@gmail.com

Address: 70 Lienhai Rd., Kaohsiung 80424, Taiwan, R.O.C.

**Chen, Chi-Chen**

Ph. D. Candidate, Institute of Education, National Sun Yat-sen University

Tel: 07-5252000

E-mail: runrice@hotmail.com

Address: 70 Lienhai Rd., Kaohsiung 80424, Taiwan, R.O.C.

**Wu, Ching-Ta**

Ph. D. Candidate, Graduate Institute of Environmental Education, National Taiwan Normal University

Tel: 04-23226940 Ext. 670

E-mail: clement670.ctw@gmail.com

Address: 1,Kuanchien Rd., North Dist., Taichung 404, R. O. C.

## **Undergraduate Students' Attitudes towards and Knowledge of Air Pollution**

**Paichi Pat Shein <sup>1</sup>, Ching-Wen Tseng <sup>2</sup>, Chi-Chen Chen <sup>3</sup>, Ching-Ta Wu <sup>4\*</sup>**

<sup>1</sup>. Associate Professor, Center for Teacher Education and Aerosol Science Research Center, National Sun Yat-sen University

<sup>2</sup>. Graduate student, Institute of Education, National Sun Yat-sen University

<sup>3</sup>. Ph. D. Candidate, Institute of Education, National Sun Yat-sen University

<sup>4</sup>. Ph. D. Candidate, Graduate Institute of Environmental Education, National Taiwan Normal University

### **Abstract**

Air pollution has become an important environmental issue globally. This study aimed to investigate how factors such as gender, health condition, connectedness to nature and well-being relate to risk argument, support for air pollution intervention measures and knowledge of PM<sub>2.5</sub>. The survey data were collected from 233 undergraduate students from various academic disciplines and analyzed using t-test analysis. The findings showed that male students are more likely to take on the “precautionary” argument than female students. Students with more connection to nature tend to take on the “precautionary” and the “pros and cons” arguments, and are more supportive of air pollution intervention measures. Those with less connection tend to take on the “relative risk” and “the small risk” arguments. The significant relationship found between risk arguments and connectedness to nature urge researchers, practitioners, and decision-makers in education and environmental policy to consider nature relatedness as means to cultivate particular orientations of risk argument towards socio-scientific issues related to the environment.

**Keywords:** connectedness to nature, air pollution, risk argument, particulate matter  
2.5, environmental issues