




Meditation practice by primary and secondary students in Perú: a confirmatory study of health and school performance

Práctica de meditación por alumnos de primaria y secundaria en Perú: un estudio confirmatorio de salud y desempeño escolar

Prática de meditação por alunos do ensino fundamental e médio no Peru: um estudo confirmatório de saúde e desempenho escolar


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health, observational
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ABSTRACT. Schools in Perú have not typically been the sites of research on meditation or its possible role in student health or primary and secondary education outcomes. This retrospective observational study seeks to begin redressing this evidentiary shortfall by confirming results from an earlier, smaller-scale study of 91 students in Huay-Huay, with a specific focus on the practice of Transcendental Meditation at Peruvian schools, some in remote locations with indigenous students. Five hundred and twenty primary and secondary students at four schools in Lima, Cusco, Puno, and Ventanilla were asked to rate their experience of meditation and its relation to four factors using a paper-and-pencil questionnaire: physical health; cognitive health; emotional health; and school performance. An average of 66% of students agreed they had benefited from practice of Transcendental Meditation in each area of health and school performance, and regularity of practice was a moderate predictor of higher scores on each variable. These quantitative findings are

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PALABRAS CLAVE

salud, investigación observacional, Perú, desempeño escolar, meditación trascendental

suggestive of a role to be played by the addition of Transcendental Meditation to primary and secondary school curricula in Perú.

RESUMEN. Las escuelas en Perú no han sido típicamente sitios de investigación sobre la meditación o su posible papel en la salud de los estudiantes o en los resultados de la educación primaria y secundaria. Este estudio observacional retrospectivo busca comenzar a corregir este déficit de evidencia al confirmar los resultados de un estudio anterior a menor escala de 91 estudiantes en Huay-Huay, con un enfoque específico en la práctica de la Meditación Trascendental en escuelas peruanas, algunas en lugares remotos con indígenas. Se pidió a quinientos veinte estudiantes de primaria y secundaria de cuatro escuelas de Lima, Cusco, Puno y Ventanilla que calificaran su experiencia de meditación y su relación con cuatro factores mediante un cuestionario de lápiz y papel: salud física; salud cognitiva; salud emocional; y rendimiento escolar. Un promedio del 66% de los estudiantes estuvo de acuerdo en que se había beneficiado de la práctica de la Meditación Trascendental en cada área de salud y desempeño escolar, y la regularidad de la práctica fue un predictor moderado de puntajes más altos en cada variable. Estos hallazgos cuantitativos sugieren el papel que debe desempeñar la incorporación de la Meditación Trascendental a los planes de estudio de las escuelas primarias y secundarias en Perú.

PALAVRAS-CHAVE

saúde, pesquisa observacional, Peru, desempenho escolar, meditação transcendental

RESUMO. As escolas no Peru normalmente não são locais de pesquisa sobre meditação ou seu possível papel na saúde do aluno ou nos resultados do ensino fundamental e médio. Este estudo observacional retrospectivo busca começar a corrigir essa deficiência de evidências, confirmando os resultados de um estudo anterior em menor escala de 91 alunos em Huay-Huay, com um foco específico na prática da Meditação Trascendental em escolas peruanas, algumas em locais remotos com indígenas alunos. Quinhentos e vinte alunos do ensino fundamental e médio de quatro escolas em Lima, Cusco, Puno e Ventanilla foram solicitados a avaliar sua experiência de meditação e sua relação com quatro fatores usando um questionário de papel e lápis: saúde física; saúde cognitiva; saúde emocional; e desempenho escolar. Uma média de 66% dos alunos concordou que se beneficiaram da prática da Meditação Trascendental em cada área da saúde e desempenho escolar, e a regularidade da prática foi um preditor moderado de pontuações mais altas em cada variável. Essas descobertas quantitativas sugerem um papel a ser desempenhado pelo acréscimo da Meditação Trascendental aos currículos das escolas primárias e secundárias no Peru.

1. INTRODUCTION

The practice of 'meditation' has been widespread throughout the world in the last 50 years. For example, 19% of the U.S. adult population (Upchurch & Johnson, 2019) and approximately 30% of Australian women (Sibbritt, Adams, & van der Riet, 2011) reportedly practice it. Uptake of meditation in Latin American countries has been of a similar magnitude, proving popular in Mexico (Ramos-Jimenez et al., 2009), Brazil (de Araujo et al., 2020), and Argentina (Saizar, 2018). The psychophysiological reasons for such a trend have been linked to reports of improved physical health (Macinko & Upchurch, 2019), reduced stress (Lynch et al., 2018), increased well-being (Chételat et al., 2018), and improved cognitive and emotional functioning, including empathy, compassion, and pro-social behaviour (Luberto et al., 2018) as a result of meditation.

The non-pharmacological benefits of meditation have also recently been cited as a motivator of this trend (Lynch et al., 2018), with interest in meditation being evenly divided among women and men in some countries (Upchurch & Johnson, 2019). However, recent evidence for its pro-social effects have indicated only moderate

impact (Kreplin, Farias, & Brazil, 2018), and Hussain and Bhushan (2010) have critiqued its psychological effects on health. However, recent data from Perú indicate that a large-scale controlled intervention of 694 public schools aimed at teaching ten 'life skills' in the primary and secondary curriculum resulted in significant changes to both well-being and academic performance (Adler, 2016).

Of most relevance to the present study is practice of the Transcendental Meditation technique and its incorporation into the curricula of schools (Herani & Kumar, 2015). The technique is practiced by school children for approximately 10-20 minutes, with recommended twice daily practice at the beginning and end of the school day. Published research on Transcendental Meditation, a simple and natural mental technique for engendering restful alertness and deep rest and for overcoming stress (Maharishi Foundation International, 2013, 2014), began appearing in the literature on physiology, neurophysiology, psychology, and sociology in the early- to mid-1970s (e.g., Orme-Johnson & Farrow, 1977). Since then, another seven volumes of research have been published covering a wider range of specialist topics, such as metabolism, biochemistry, electrophysiological and electroencephalographic changes, perceptual and motor abilities, cardiovascular changes, health and education, productivity, and quality of life, as well as impacts on the wider community (Chalmers et al., 1989a, 1989b, 1989c; Dillbeck, 2011; Dillbeck et al., 2013, 2020; Wallace Orme-Johnson, & Dillbeck, 1990).

For example, researchers have found evidence that regular practice of Transcendental Meditation by 142 school children in the U.S. aged between 14 and 16 years decreased anxiety, improved sleep, and increased positive mood, resilience, and self-control when compared to 53 students at another school where Transcendental Meditation was not incorporated into the curriculum (Wendt et al., 2015). In the same age group, Rosaen and Benn (2006) using a descriptive qualitative design found students who regularly practiced Transcendental Meditation for one year increased their state of restfulness, improved in skills indicative of emotional intelligence, including increased self-control, self-reflection, and flexibility in emotional response, and improved their academic performance.

Confirming earlier research, which identified both short- and long-term improvements in athletic performance and physiological development (Reddy, Lakshmi & Rao, 1977), Belham (2011) found that military cadets in Brazil who practiced Transcendental Meditation showed an increased capacity for attention (including improved memory of details), improved emotional functioning, increased physical strength (specifically when doing push-ups), and reduced resting heart rate. Moreover, Nidich et al. (2011) found U.S. school students who initially scored below basic proficiency levels showed improved achievements in mathematics and English language after three months of regular practice of Transcendental Meditation when compared to matched control students. However, most of these studies were conducted in settings outside Latin America, thereby necessitating this study.

Three studies by the present authors have recently explored the phenomenon of Transcendental Meditation practice in Perú. A third-person study, using a learning history model from semi-structured interviews, was conducted to hear and understand the distinct voices of parents and teachers about the effect of practicing Transcendental Meditation on the personal, academic, and social lives of indigenous Aymara primary and secondary school children in Puno (Fergusson, Ortiz Cabrejos, & Bonshek, 2021a). Results indicated that a



series of confirmatory as well as unique knowledge outcomes had emerged in this setting. For example, the study found confirmatory evidence of reduced anxiety, worry, and depression, increased intelligence and creativity, improved physical health, and improved academic performance, including improved learning ability, focus, and ability to concentrate. But the study also found evidence of reduced levels of arrogance and 'a sense of privilege', as well as a more 'developed sense of ambition' which was surprisingly found to be 'independent of greed'.

A second study on the longer-term outcomes in Puno used a five-level qualitative approach to explore the experiences of six long-term practitioners of Transcendental Meditation who had regularly employed the technique for an average of 15 years (Fergusson, Ortiz Cabrejos, & Bonshek, 2020). Participants were again from the Aymara population. Findings suggested that experiences of long-term meditators in Puno were largely consistent with prior international research outcomes on Transcendental Meditation, including important changes to their consciousness, mental and physical health, and behavior, with data analysed for confirmatory or dissimilar evidence vis-à-vis international findings.

Finally, a study was carried out at Colegio German Pomalzo Rixe, a government-run primary and secondary public school, with 91 randomly selected school children, ranging from 11 to 16 years of age, in a remote Peruvian town in the central Andean mountains called Huay-Huay (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b). This quantitative research used a paper-and-pencil instrument with 47 questions to ask students about their experiences with Transcendental Meditation and its relationship to health and school performance. The study considered whether the practice impacted the lives of students, and if so to what extent.

Data indicated 73% of students agreed the practice of Transcendental Meditation had improved their physical health, 81% and 86% respectively agreed the practice had positively impacted their cognitive and emotional health. Eighty two percent of students also agreed that Transcendental Meditation improved their performance at school, including their satisfaction at school, getting along better with classmates, academic achievement, and truancy. The findings were more pronounced when students meditated regularly as part of their school's curriculum.

However, the relatively small number of students and an impediment to reliability associated with the use of dichotomous 'agree/disagree' answers to measure health and academic performance (and thereby possibly contributing to acquiescence bias) were identified as limitations of the study, necessitating the need for the present cross-sectional confirmatory study of a larger cohort of students from a more widely distributed student base soliciting non-binary answers using a Likert scale, making statistical analysis more reliable. To better understand and confirm the findings from Huay-Huay, we therefore ask the following two research questions: RQ#1: Do the majority of a large and well-distributed sample of primary and secondary school students in Perú report the practice of Transcendental Meditation is beneficial to their health and school performance to measure physical health, cognitive health, emotional health, and school performance; and if so, RQ#2: Are these self-reported benefits related to the regularity with which students practice Transcendental Meditation?

Thus, the objectives of the present confirmatory study in Perú were to further test: 1) the proposition that practice of Transcendental Meditation by school children is advantageous to psychophysiological health and school performance using a much larger sample from more diverse regional areas of the country; 2) the finding that any advantage of the practice is linked to the recommended guidelines of practice; and 3) whether the earlier findings of advantage can be observed when students use non-binary, dichotomous answers to study questions.

2. METHOD

The research project was approved in October 2019 by the Research Ethics Approval Committee of Maharishi Vedic Research Institute (MVRI) in Australia, in accord with both MVRI's Code of Research Practice and Procedure and the Australian Code for the Responsible Conduct of Research and was conducted under approval number: MVRI-2019-16. The project was approved in advance by the administrations of each school, where students meditated as part of their curriculum under agreement with Instituto Maharishi de Ciencia y Tecnología del Perú; all participants (or their guardians) provided prior informed consent.

Participating Schools: Participating schools were chosen because they are located in distinct geographic, cultural, and ethnolinguistically diverse areas of Perú, including coastal, urban, and high Andean regions populated by indigenous as well as non-indigenous students. The four schools were purposively selected for this study because: 1) they each represented a different geographic region of Perú; 2) Transcendental Meditation had been incorporated into the curriculum for a minimum of one year; and 3) a minimum of 500 primary and or secondary students had been instructed in the practice within the previous 12-month period, with at least 50 students available from each school to participate in the study.

School #1: Institucion Educativa Emblematica Cesar Vallejo, a government-run public school, is located in the La Victoria district of central Lima. La Victoria is one of the most densely populated and dangerous areas of Lima and is home to about 185,000 people within its 8.7km² area. It is mainly a residential community, with 'slums' in the north, pueblos jóvenes (or squatter settlements) in the east, and middle-income housing in the south, but with high levels of crime and unemployment throughout the district. Cesar Vallejo has an enrolment of 1,400 mostly disadvantaged students across all primary and secondary grade levels. Transcendental Meditation was introduced into the curriculum in 2014, with approximately 2,000 students instructed in the practice between 2014-2019.

School #2: Institución Educativa Privada Prescott, a private school, is located in the city of Puno on Lake Titicaca in the southeast of the country. Puno is home to the Aymara people, a continuous pre-Incan civilization living at 3,800m on the Altiplano in the Andean highlands. With a total population of about 3.0 million people, the Aymara are distributed across eastern Bolivia, southern Perú and northern Chile, with the largest group concentrated in the Lake Titicaca region. The Prescott school, established in 1992 to offer primary and secondary education, seeks to develop the values of honesty, work, social sensitivity, responsibility towards the community, and respect for the family, the homeland and the globalized world. Approximately 300 students attend the school, with 2,000 students having been instructed in Transcendental Meditation since 1998.

School #3: Institución Educativa Colegio Santa María Reyna, a private school, is located in the Ventanilla district of the Constitutional Province of Callao. Approximately 500,000 people inhabit the coastal region of Callao, but Ventanilla is an underprivileged district and was mostly deserted until about 40 years ago. Colegio Santa María

Reyna seeks to develop student potential by not only conforming to the National Curriculum but also by incorporating what it calls 'alternative methodologies'. The school has an enrolment of 400 students, with Transcendental Meditation introduced into the primary and secondary curriculum in 2016; approximately 500 students have been instructed in the practice over five years.

School #4: Colegio Tomasa Tito Condemayta, a government-run public school, is located in the Acomayo district of Cusco. In addition to its unique geographic location high in the Andes at 3,300m, the Acomayo district is populated by 24,000 mostly indigenous Quechea who, like the Aymara of Puno, are a pre-Incan people of Perú, Bolivia, and Chile. This secondary school, named after Tomasa Tito Condemayta Hurtado de Mendoza (1729-1781) a leading force in the indigenous uprising against Spanish colonial rule under King Tupac Amaru II in the 18th century, has approximately 600 students with almost all of them having learned Transcendental Meditation during 2019.

Participants. Five hundred and twenty primary and secondary students (M age = 12.6), who were purposively sampled for the study, volunteered to participate. Inclusion criteria for volunteers included: 1) primary- or secondary-aged student; 2) self-reported they practiced Transcendental Meditation for at least six months prior to data collection as part of their school's curriculum; and 3) were willing to answer written questions honestly.

Of these students, 277 were girls (M age = 12.6) and 243 were boys (M age = 12.5), distributed across seven grades. Two hundred and seven participants (40%, M age = 10.7) were in 5th grade primary school, 92 participants (18%, M age = 11.7) were in 6th grade primary school, 26 participants (5%, M age = 12.6) were in 1st grade secondary school, 64 participants (12%, M age = 13.6) were in 2nd grade secondary school, 43 participants (8%, M age = 14.7) were in 3rd grade secondary school, 64 participants (12%, M age = 15.64) were in 4th grade secondary school, and 24 participants (5%, M age = 16.4) were in 5th grade secondary school. These participant data, and more detailed schools' data, are summarised in Table 1.

Participants from **School #1** consisted of two tranches of testing: Tranche A, which was tested in November 2019, consisted of 136 primary school students (M age = 11.0) of whom 72 were girls (53%, M age = 11.0) and 64 were boys (47%, M age = 11.0) and Tranche B, which was tested in January 2020, consisted of 144 primary school students (M age = 11.0 years), of whom 77 were girls (53%, M age = 11.0) and 67 were boys (47%, M age = 11.1). At the time of testing, 94 participants in Tranche A (69%, M age = 10.8) were in 5th grade primary, and 42 participants (31%, M age = 11.6) were in 6th grade primary, and 102 participants in Tranche B (71%, M age = 10.8) were in 5th grade primary, and 42 participants (29%, M age = 11.6) were in 6th grade primary.

Table 1: Demographic data for gender and grade levels for all schools.

Participants	Gender		Grade Levels						
	Girls	Boys	5 th Grade Primary	6 th Grade Primary	1 st Grade Secondary	2 nd Grade Secondary	3 rd Grade Secondary	4 th Grade Secondary	5 th Grade Secondary
School #1 (Tranche A)	72 (53%)	64 (47%)	94 (69%)	42 (31%)	—	—	—	—	—
Mean Age	11.06	11.09 (0.68)	10.80	11.69 (0.52)	—	—	—	—	—

(SD)	(0.66)		(0.53)						
School #1 (Tranche B)	77 (53%)	67 (47%)	102 (71%)	42 (29%)	—	—	—	—	—
Mean Age	11.00	11.12	10.80	11.67	—	—	—	—	—
(SD)	(0.65)	(0.69)	(0.55)	(0.53)	—	—	—	—	—
School #2	27 (50%)	26 (50%)	—	—	10 (19%)	13 (24%)	9 (17%)	11 (21%)	10 (19%)
Mean Age	14.48	14.35	—	—	12.40	13.54	14.56	15.45	16.30
(SD)	(1.4)	(1.4)	—	—	(0.52)	(0.52)	(0.53)	(0.52)	(0.67)
School #3	34 (49%)	36 (51%)	11 (16%)	8 (11%)	6 (9%)	4 (7%)	14 (19%)	13 (19%)	14 (19%)
Mean Age	13.88	14.14	10.36	11.88	12.33	13.50	14.79	15.85	16.50
(SD)	(2.4)	(2.2)	(0.50)	(0.64)	(0.52)	(0.58)	(0.58)	(0.69)	(0.65)
School #4	67 (57%)	50 (43%)	—	—	10 (9%)	47 (40%)	20 (17%)	40 (34%)	—
Mean Age	14.52	14.04	—	—	13.10	13.68	14.75	15.60	—
(SD)	(1.1)	(1.1)	—	—	(0.74)	(0.59)	(0.64)	(0.67)	—
Total (%)	277 (40%)	243 (47%)	207 (40%)	92 (18%)	26 (5%)	64 (12%)	43 (8%)	64 (12%)	24 (5%)
Mean Age	12.66	12.58	10.78 (0.55)	11.79 (0.54)	12.65	13.64	14.72	15.63	16.42
(SD)	(2.0)	(2.0)			(0.69)	(0.57)	(0.49)	(0.65)	(0.65)

Participants from **School #2** consisted of 53 secondary school students (M age = 14.6) tested in November 2019, of whom 27 were girls (50%, M age = 14.4) and 26 were boys (50%, M age = 14.3). At the time of data gathering, 10 participants (19%, M age = 12.4) were in 1st grade secondary, 13 participants (24%, M age = 13.5) were in 2nd grade secondary, 9 participants (17%, M age = 14.5) were in 3rd grade secondary, 11 participants (21%, M age = 15.4) were in 4th grade secondary, and 10 participants (19%, M age = 16.3) were in 5th grade secondary.

Participants from **School #3** consisted of 70 primary and secondary school students (M age = 14.0) tested in November 2019, of whom 34 were girls (49%, M age = 13.8) and 36 were boys (51%, M age = 14.1). At the time of data gathering, 11 participants (16%, M age = 10.3) were in 5th grade, 8 participants (11%, M age = 11.8) were in 6th grade, 6 participants (9%, M age = 12.3) were in 1st grade secondary, 4 participants (7%, M age = 13.5) were in 2nd grade secondary, 14 participants (19%, M age = 14.7) were in 3rd grade secondary, 13 participants (19%, M age = 15.8) were in 4th grade secondary, and 14 participants (19%, M age = 16.5) were in 5th grade secondary.

Participants from **School #4** consisted of 117 secondary school students (M age = 12.6 years) tested in November 2019, of whom 67 were girls (57%, M age = 14.5) and 50 were boys (43%, M age = 14.4). At the time of data gathering, 10 participants (9%, M age = 13.1) were in 1st grade secondary, 47 participants (40%, M age = 13.6) were in 2nd grade secondary, 20 participants (17%, M age = 14.7) were in 3rd grade secondary, and 40 participants (34%, M age = 15.6) were in 4th grade secondary.

School and Participant Involvement. Schools and participants were not involved in setting the research questions, study objectives, or outcome measures, and none were involved in developing plans for design or implementation of the study (other than sanctioning the research). No schools or participants were asked to advise on interpretation or writing up of results, and there are no plans to disseminate the results of the research to school administrators or study participants.

Instrumentation. A paper-and-pencil test, completed anonymously by students, was developed and administered by the second author. This Spanish-language questionnaire consisted of 47 statements, requiring a self-reported rating on a 1-10 Likert scale, with 1-3 representing 'definitely disagree', 4-5 'disagree', 6-7 'agree', and 8-10 'definitely agree'. Scores of <5.50 therefore mean that a student definitely disagrees or disagrees with the statement, while scores of ≥ 5.50 mean the student agrees or definitely agrees with the statement. Statements

were clustered into the following four main categories: Factor 1—Physical Health; Factor 2—Cognitive Health; Factor 3—Emotional Health; and Factor 4—School Performance. These four Factors are consistent with the ten ‘focus areas’ of the aforementioned study in Perú sanctioned by the Ministry of Education, specifically developing elements of the primary and secondary curriculum to include sports, critical thinking and decision making, management of emotions and stress, and mental and emotional strength as they relate to academic performance (Adler, 2016).

Factor 1—Physical Health. Factor 1 (F1) included 13 statements related to physical health, with students asked to rate their levels of tiredness, energy, sickness, quality of sleep, and athletic ability because of practicing Transcendental Meditation. For example, statement #3 of F1 was: ‘Tengo más energía’ (I have more energy). The importance of physical health, particularly preventive measures such as exercise, and its place in primary and secondary curricula have been the subject of extensive international research because it has generally been accepted that maintaining physical health is central to a child’s education and healthy future. Thus, Gates et al. (2018, p. 1484) have pointed out that “physical inactivity and deconditioning are inextricably linked to the present and future health outcomes for patients, communities and nations”, which is the reason some jurisdictions consider physical education should be a core part of any primary and secondary education curriculum (Harris, 2019). Practice of Transcendental Meditation has been found to reduce stress and improve physical health, and hence why it has been incorporated into the curricula of many schools in 49 countries (Herani & Kumar, 2015).

Factor 2—Cognitive Health. Factor 2 (F2) included 10 statements related to cognitive health, with students asked to rate their memory, comprehension, and problem-solving ability because of practicing Transcendental Meditation, each of which has been documented to improve as a result of the practice, including reduced symptoms of ADHD, improved executive function, improved metacognition, and improved performance measures of executive performance (Grosswald et al., 2009). Moreover, physical activity in children is associated with brain functioning and cognitive health, including working memory, episodic memory, sustained attention, and processing speed (Geertsen et al., 2016), and cognitive health is associated with school performance (Liu et al., 2015). For example, statement #4 of F2 was: ‘Entiendo mejor las cosas’ (I understand things more).

Factor 3—Emotional Health. Factor 3 (F3) included 12 statements related to emotional health, with students asked to rate their aggression, affective relations, friendliness, and happiness because of practicing Transcendental Meditation. For example, statement #11 of F3 was: ‘Me siento más confiado en lo que hago’ (I feel more confident in what I do). Research has established links between a child’s emotional health and their social and psychological well-being (Thompson et al., 2017) and improved emotional health, such as reduced depression, has been associated with practice of Transcendental Meditation (e.g., Elder et al., 2014). In a controlled study of 101 students aged between 13-15, Valosek et al. (2019) similarly found increased social-emotional competencies, including increases in taking responsibility, speaking positively, contributing to the group, and showing care in work, and in a second controlled study of 9-12-year-olds, Bleasdale et al. (2019) found reduced levels of anxiety, depression, stress, and anger in a group who practiced Transcendental Meditation for four months compared to a control.

Factor 4—School Performance. Factor 4 (F4) included 12 questions related to academic and general performance at school, with students asked to rate their satisfaction and efficiency at school, getting along with



classmates, academic achievement, and truancy because of practicing Transcendental Meditation. For example, statement #1 of F4 was: 'Me siento satisfecho en mi colegio' (I feel satisfied in my school). School performance is a multi-faceted measure and can incorporate academic elements such as grades and exam results, but also includes skills and strategies, and is associated with life satisfaction in children (Ng, Huebner, & Hills, 2015). A significant number of earlier published studies identified Transcendental Meditation as a positive contributor to school performance (e.g., Nidich & Nidich, 1989). Each of these four Factors was identified as relevant for school children in Perú and the development of statements was informed by prior international research findings using the lines-of-inquiry and research protocol method outlined by Fergusson et al. (2019). The earlier work of Benn (2003) and Rosaen and Benn (2006) informed the identification of key variables in school children, but space disallows a more fulsome description of the origin and definition of each Factor used in this study.

Regularity of Practice. In the same questionnaire, students were asked to report the regularity with which they practiced Transcendental Meditation since being instructed, with response options being: 1) the recommended daily routine 'twice a day' (scored as 5); 2) 'once a day' (scored as 4), 3) 'from time-to-time' (scored as 3); 4) 'when required' (scored as 2); and 'never' (scored as 1). As noted above, regularity of practice of Transcendental Meditation has been previously been found to correlate with higher levels of childhood resilience.

Cronbach alpha coefficients computed for scale reliability within Factors and Factors in relation to each other and to the overall construct of health and school performance (i.e., the combined score of all Factors) had previously yielded internal consistencies of $C\alpha = .52$, $C\alpha = .60$, $C\alpha = .55$, and $C\alpha = .62$ for Factors 1, 2, 3, and 4, respectively, $C\alpha = .81$ for the average reliability between Factors, and $C\alpha = .86$ for all Factors combined in prior research using the same measures (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b). Validity in the present study was based on the extensive theoretical basis upon which the practice of Transcendental Meditation has been developed (e.g., Walton et al., 2005). Construct and content validity were maintained by following procedures outlined by Fergusson et al. (2019) when linking lines-of-inquiry with study questions as sources of evidence.

Study Design and Procedure. This cross-sectional observational study was conducted in November and December 2019. Completion of the paper-based questionnaire took students approximately 15 minutes and was conducted in one session per grade level in each school as part of the students' normal class routine. Gilmartin-Thomas, Liew and Hopper (2018, p. 83) have pointed out that an observational study of this type allows the researcher to describe and profile a "population or outcome of interest at a single time point...[when there is a] need for representative data". Such a design can be seen in a comparable study (Ho & Hendi, 2018) and is suited in this context because it satisfies the study objectives to profile meditating students at a moment in time to confirm the earlier findings from Huay-Huay (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b).

Data Analysis. To answer RQ#1, descriptive and inferential statistics will be used to analyse these data. First, scale reliability will be measured by Cronbach alphas calculated for internal consistency of all Factors combined (Heo, Kim, & Faith, 2015). Second, the number and percentage of respondents, with means and standard deviations, who selected an answer on the definitely disagree > definitely agree scale will be recorded for each school and Factor. Third, the number and percentage of respondents, with means and standard deviations, who selected an answer on the definitely disagree > definitely agree scale will be recorded for the combined score of

all schools by Factor; Factor scores <5.50 (definitely disagree/disagree) and ≥ 5.50 (agree/definitely agree) will be tested for difference on the combined scores of all schools using analysis of variance (ANOVA). These analyses will be cross-tested for the combined scores of all schools using Cohen (d) effect sizes between these two high and low score sets. Fourth, multivariate analyses of variance (MANOVA) and tests of difference will be used to measure any differences on Factors between schools, grade levels, and gender. Fifth, correlational analysis will be conducted using Pearson product moment correlation coefficients between all Factors.

To answer RQ#2, analysis will be conducted using Pearson product moment correlation coefficients between all Factors and regularity of Transcendental Meditation practice. All analyses will be tested using SPSS 26 at the two-tailed, $p < .01$ level of significance.

3. RESULTS

The Cronbach alpha coefficient computed for scale reliability of the combined score of all Factors was $C\alpha = .92$, comparable to the earlier $C\alpha = .86$ coefficient in Huay-Huay (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b). Table 2 presents the number and percentage of respondents, with means and standard deviations, who selected an answer on the ten-point definitely disagree > definitely agree scale for each school and Factor.

These findings indicate the average response to all Factors in School #1 was 6.94, in School #2 was 6.38, in School #3 was 6.31, and in School #4 was 6.63, scores which mean students generally agreed with the statements that Transcendental Meditation benefited their health and school performance. At a more detailed level, Table 2 also shows that 59% of participants in School #1 (164 out of 280 participants) agreed or definitely agreed that their physical health had benefited from the practice of Transcendental Meditation, 69% of participants (192 out of 280 participants) agreed or definitely agreed that their cognitive health had benefited from the practice, and 77% of participants (216 out of 280 participants) agreed or definitely agreed that their emotional health had benefited from the practice. Seventy nine percent of participants (222 out of 280 participants) agreed or definitely agreed that their school performance had benefited from the practice of Transcendental Meditation.

The findings at School #1 are somewhat higher than the other schools. Of these, 47%, 46%, and 64% of participants in Schools #2, #3, and #4 respectively agreed or definitely agreed that their physical health had benefited from the practice of Transcendental Meditation, 56%, 53%, and 64% of participants in Schools #2, #3, and #4 respectively agreed or definitely agreed that their cognitive health benefited from the practice, and 60%, 63%, and 71% of participants in Schools #2, #3, and #4 respectively agreed or definitely agreed that their emotional health benefited from the practice. Fifty seven percent, 62%, and 72% of participants in Schools #2, #3, and #4 agreed or definitely agreed that their school performance benefited from the practice of Transcendental Meditation.

Table 2: Number and percentage of respondents in each Factor by participating school, with means and standard deviations.

Factor	Response				Mean and Standard Deviation
	Number and Percentage of Respondents (Definitely Disagree)	Number and Percentage of Respondents (Disagree)	Number and Percentage of Respondents (Agree)	Number and Percentage of Respondents (Definitely Agree)	
School #1 (Tranche A, n = 136)					
Factor 1	n = 16, 12%	n = 39, 28%	n = 57, 42%	n = 24, 18%	M = 6.28, SD = 1.8
Factor 2	n = 10, 7%	n = 33, 24%	n = 58, 43%	n = 35, 26%	M = 6.76, SD = 1.9
Factor 3	n = 5, 4%	n = 24, 18%	n = 59, 43%	n = 48, 35%	M = 7.20, SD = 1.6
Factor 4	n = 4, 3%	n = 22, 16%	n = 48, 35%	n = 62, 46%	M = 7.51, SD = 1.6
Average	n = 9, 7%	n = 30, 22%	n = 48, 41%	n = 43, 30%	M = 6.94, SD = 1.7
School #1 (Tranche B, n = 144)					
Factor 1	n = 20, 14%	n = 41, 28%	n = 60, 42%	n = 23, 16%	M = 6.19, SD = 1.8
Factor 2	n = 14, 9%	n = 31, 22%	n = 65, 45%	n = 34, 24%	M = 6.61, SD = 1.9
Factor 3	n = 9, 6%	n = 26, 18%	n = 61, 43%	n = 48, 33%	M = 6.98, SD = 1.8
Factor 4	n = 7, 5%	n = 25, 17%	n = 50, 35%	n = 62, 43%	M = 7.27, SD = 1.8
Average	n = 13, 9%	n = 31, 21%	n = 59, 41%	n = 42, 29%	M = 6.94, SD = 1.7
School #2 (n = 53)					
Factor 1	n = 0, 0%	n = 28, 53%	n = 23, 43%	n = 2, 4%	M = 6.01, SD = 1.0
Factor 2	n = 1, 2%	n = 22, 42%	n = 25, 47%	n = 5, 9%	M = 6.40, SD = 1.2
Factor 3	n = 2, 4%	n = 19, 36%	n = 25, 47%	n = 7, 13%	M = 6.50, SD = 1.4
Factor 4	n = 1, 2%	n = 22, 41%	n = 19, 36%	n = 11, 21%	M = 6.62, SD = 1.4
Average	n = 1, 2%	n = 23, 43%	n = 19, 43%	n = 11, 12%	M = 6.38, SD = 1.2
School #3 (n = 70)					
Factor 1	n = 7, 10%	n = 31, 44%	n = 20, 29%	n = 12, 17%	M = 6.00, SD = 1.9
Factor 2	n = 8, 11%	n = 25, 36%	n = 24, 34%	n = 13, 19%	M = 6.16, SD = 1.9
Factor 3	n = 6, 9%	n = 20, 28%	n = 30, 43%	n = 14, 20%	M = 6.56, SD = 1.8
Factor 4	n = 5, 7%	n = 22, 31%	n = 32, 46%	n = 11, 16%	M = 6.51, SD = 1.7
Average	n = 6, 9%	n = 25, 35%	n = 27, 38%	n = 12, 18%	M = 6.31, SD = 1.8
School #4 (n = 117)					
Factor 1	n = 7, 6%	n = 35, 30%	n = 57, 49%	n = 18, 15%	M = 6.37, SD = 1.6
Factor 2	n = 10, 9%	n = 32, 27%	n = 46, 39%	n = 29, 25%	M = 6.60, SD = 1.7
Factor 3	n = 3, 3%	n = 30, 26%	n = 40, 34%	n = 44, 37%	M = 7.05, SD = 1.6
Factor 4	n = 6, 5%	n = 27, 23%	n = 43, 37%	n = 41, 35%	M = 6.51, SD = 1.7
Average	n = 6, 5%	n = 31, 27%	n = 47, 40%	n = 33, 28%	M = 6.63, SD = 1.7

As shown in Table 3, 57% of all participants (296 out of 520 participants) agreed or definitely agreed that their physical health had benefited from the practice of Transcendental Meditation, 64% of participants (334 out of 520 participants) agreed or definitely agreed that their cognitive health benefited from the practice, and 72% of participants (376 out of 520 participants) agreed or definitely agreed that their emotional health benefited from the practice. Sixty seven percent of participants (379 out of 520 participants) agreed or definitely agreed that their school performance benefited from the practice. Across all Factors, an average of 66% of all participants (347 out of 520 participants) either agreed or definitely agreed that they had benefited from practice of Transcendental Meditation, thereby answering RQ#1.

Table 3: Number and percentage of respondents in each response category by Factor, with means and standard deviations.

Number of Responses for All Schools (N = 520)					
Factor	Number and Percentage of Respondents (Definitely Disagree)	Number and Percentage of Respondents (Disagree)	Number and Percentage of Respondents (Agree)	Number and Percentage of Respondents (Definitely Agree)	Mean and Standard Deviation
Factor 1	n = 50, 10%	n = 174, 33%	n = 217, 42%	n = 79, 15%	M = 6.15, SD = 1.7
Factor 2	n = 43, 8%	n = 143, 28%	n = 218, 42%	n = 116, 22%	M = 6.46, SD = 1.7
Factor 3	n = 25, 5%	n = 119, 23%	n = 215, 41%	n = 161, 31%	M = 6.80, SD = 1.7
Factor 4	n = 23, 5%	n = 118, 23%	n = 192, 41%	n = 187, 31%	M = 6.75, SD = 1.7
Average	N = 35, 7%	N = 138, 27%	N = 211, 41%	N = 136, 25%	M = 6.54, SD = 1.7

	Score <5.50 (Definitely Disagree/Disagree)		Score ≥5.50 (Agree/Definitely Agree)		ANOVA	
	M	SD	M	SD	F	p
Factor 1	5.91	1.1	6.34	1.0	29.44	<.01
Factor 2	4.59	1.0	7.65	1.0	30.83	<.01
Factor 3	4.84	1.1	7.72	1.0	28.33	<.01
Factor 4	4.91	1.1	7.88	1.0	29.02	<.01
Average	5.06	1.1	7.39	1.0	—	—

These findings are reflected further in the Table 3, which show the total average scores for all participants ≥ 5.50 (i.e., an average response of agree/definitely agree) for F1 were 6.34, for F2 were 7.65, for F3 were 7.72, and for F4 were 7.88, with an average total score of 7.39 on the ten-point scale. The difference between these scores and those of definitely disagree/disagree was statistically significant ($F = 29.40$, $p < .01$). Similarly, the effect size between these two data sets was for F1 $d = .43$, for F2 $d = 3.0$, for F3 $d = 2.8$, and for F4 $d = 2.6$, with an average effect size for all Factors of $d = 2.2$.

Table 4: Correlational data for Factors and regularity of Transcendental Meditation practice.

	Variable			Regularity of Transcendental Meditation
	Factor 1	Factor 2	Factor 3	
Factor 1	—	—	—	$r = .27$
Factor 2	$r = .74$	—	—	$r = .35$
Factor 3	$r = .72$	$r = .77$	—	$r = .26$
Factor 4	$r = .68$	$r = .77$	$r = .83$	$r = .30$

All correlations significant to $p < .01$.

MANOVA and tests of difference data for all tests of difference between schools, grade levels, and genders, indicating: there was no significant difference between schools for F1 and F2, but there was a difference between schools for F3 and F4; there was a significant difference on all Factors between the seven grade levels; but no difference was observed between genders on any Factor.



Table 4 shows that each Factor was correlated with each other Factor. Correlation values ranged between $r = .68-.83$, with all probabilities greater than 99% level of confidence. Of perhaps more interest is the observation that regularity of practice of Transcendental Meditation was moderately correlated with each Factor, thereby answering RQ#2. Correlation values ranged between $r = .27-.35$, with all probabilities greater than 99% level of confidence.

4. DISCUSSION

Results in Table 3 indicate that an average of 66% of the primary and secondary students in Perú in this study reported practice of Transcendental Meditation had been beneficial to their health and school performance, with an average disagreement rating of 5.06 compared to an average agreement rating of 7.39, thereby answering RQ#1 in the affirmative. Fifty-seven percent of students reported that Transcendental Meditation had benefited their physical health, 64% said it impacted their cognitive health, 72% said it impacted their emotional health, and 72% reported that their performance at school had been positively affected, and the differences between low and high score sets were confirmed by analyses of variance (F1, 5.91 compared to 6.34, $F = 29.44$; F2, 4.59 compared to 7.65, $F = 30.83$; F3, 4.84 compared to 7.72, $F = 28.33$; and F4, 4.91 compared to 7.88, $F = 29.02$).

This observation was confirmed by analyses which indicated an average effect size of $d = 2.2$ between those students who agreed that Transcendental Meditation had beneficially impacted their health and school performance compared to those who did not, thus supporting the earlier experimental work of Elder et al. (2014), Grosswald et al. (2009), Nidich and Nidich (1989), and Wendt et al. (2015). Moreover, these data are mostly consistent with the findings from Huay-Huay, although the dichotomous answering method used in that study may have caused the somewhat earlier higher response rates. For example, in Huay-Huay 73%, 81%, 86%, and 82% of students agreed that practice of Transcendental Meditation had a salutary effect on physical health, cognitive health, emotional health, and school performance, respectively (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b). Effect sizes were somewhat consistent between the two studies (physical health $d = .43$ in the present context versus $d = 1.8$, cognitive health $d = 3.0$ versus $d = 2.2$, emotional health $d = 2.8$ versus $d = 3.5$, and school performance $d = 2.6$ versus $d = 2.5$).

Average scores by school indicate a similar outcome, with students in School #1 = 6.84, School #2 = 6.38, School #3 = 6.30, and School #4 = 6.63 mostly agreeing the impact of Transcendental Meditation was of benefit to health and school performance, although F3 and F4 were rated somewhat differently than F1 and F2 in this study. The impact of Transcendental Meditation on health and school performance in Perú apparently differs according to grade level, with lower scores generally rated for all Factors by 1st grade secondary students compared to other grade levels, for which no obvious explanation has been forthcoming. Such a difference was not observed in Huay-Huay. However, no statistically significant difference was observed between girls and boys in either this study or the earlier study in Huay-Huay (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b).

Table 4 indicates that physical health, cognitive health, and emotional health are all strong predictors of school performance, a finding consistent with extensive earlier research which suggests that physical and mental health,

for example, are reliable predictors of academic achievement (e.g., Lui et al., 2015; Taras, 2005). Moreover, these data largely confirm the Huay-Huay findings with, for example, $\text{corr}(F2,F3) = .77$ in this study and $\text{corr}(F2,F3) = .70$ in Huay-Huay, and $\text{corr}(F3,F4) = .83$ in this study and $\text{corr}(F3,F4) = .75$ in Huay-Huay (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b).

Data in Table 4 also answer RQ#2 in the affirmative, showing that the regularity with which primary and secondary students in Perú practice Transcendental Meditation is a reliable predictor of both their health outcomes and school performance, with $\text{corr}(\text{Regularity},F1) r = .27$, $\text{corr}(\text{Regularity},F2) r = .35$, $\text{corr}(\text{Regularity},F3) r = .26$, and $\text{corr}(\text{Regularity},F4) r = .30$. In Huay-Huay, these same associations, using both Pearson product moment correlations and point biserial correlations, were observed: $\text{corr}(\text{Regularity},F1) r = .28$; $\text{corr}(\text{Regularity},F2) r = .39$; $\text{corr}(\text{Regularity},F3) r = .41$, and $\text{corr}(\text{Regularity},F4) r = .37$ (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b). These two main findings—that health is a reliable predictor of academic performance and regularity of Transcendental Meditation practice is a reliable predictor of both health and academic performance—are of relevance to primary and secondary education. The first might encourage a focus on ensuring that curricula include adequate and ample health education as recommended in a large-scale study by Adler (2016) for Perú, and the second would suggest that incorporation of meditation in general, and Transcendental Meditation in particular, into primary and secondary curricula would, among other salutary outcomes, affect student cognitive skills, such as those associated with ‘attention’ and a student’s ability for alerting, orienting, and conflict monitoring (Bajjal, et al., 2011).

However, Johns and Miraglia (2015, p. 1) have pointed out “the use of self-reports has generated considerable controversy among researchers in health psychology, organizational psychology, and organizational behavior”.

On one hand, such reports are relatively easy to obtain and often provide information that is hard to access by any other means. On the other hand, self-reports have been criticized as being prone to a variety of biases encompassing inaccurate memory, inflated self-presentation, and self-delusion. In addition, the exclusive use of self-reports has been implicated in inflating relationships among variables due to common method variance.

Such limitations with the present study should be noted. For example, in the present study, participant reactivity, which can cast doubt on both the reliability and validity of research findings as discussed in detail elsewhere by Bennetts et al. (2017), may have caused students to tailor responses to meet the expectations of their teachers and/or the researcher, despite each party being blind to the objectives of the study.

One way we attempted to counter a possible Type I error caused by reactivity was by having a sufficiently large sample size and phrasing questions to discourage participants thinking they have a social or collective obligation to answer in a certain way. Random selection would have further reduced the likelihood of invalid results. However, the likelihood of acquiescence bias has been eliminated in this study, and no such patterns of the ‘friendliness effect’ were observed in these data.

Moreover, of importance in psychometric studies of this kind is the need for using valid test instruments; use of a less thoroughly scrutinised instrument in the present study, which had not undergone investigation beyond



initial tests of internal reliability and construct and content validity, is of some concern, specifically related to the possible occurrence of common method variance. Further validity research of the test instrument is therefore required.

To this end, we propose that future research on the application of Transcendental Meditation practice in the primary and secondary school curriculum should: A) use random selection of student participants, not volunteers; B) test the inter-rater and test-retest reliability and the criterion-related and construct validity of the Spanish-language questionnaire to determine its viable use in primary and secondary education in Perú and elsewhere in Latin America; and C) further minimize possible bias from participant reactivity by using a more robust experimental design.

5. CONCLUSION

The findings in this study expand our understanding of the practice of Transcendental Meditation by school children in Perú. These broad-based observations about majority acceptance of Transcendental Meditation as a practice for affecting health and school performance largely confirm the findings of our earlier study in Huay-Huay, which used the same set of 47 questions, and is supportive of other studies conducted in non-Latin American educational settings. In the same way the earlier study found regularity of practicing Transcendental Meditation by Peruvian school children was a reliable predictor of physical health, cognitive health, emotional health, and school performance, the present data are suggestive of a valuable role to be played by the addition of Transcendental Meditation to primary and secondary school curricula.

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