PSYCHOLOGY MISCELLANY

No.125 November 2019

Kevin Brewer

ISSN: 1754-2200

Orsett Psychological Services
PO Box 179
Grays
Essex
RM16 3EW
UK

orsettpsychologicalservices@phonecoop.coop

This document is produced under two principles:

1. All work is sourced to the original authors. The images are all available in the public domain (most from http://commons.wikimedia.org/wiki/Main_Page). You are free to use this document, but, please, quote the source (Kevin Brewer 2019) and do not claim it as you own work.

2. Details of the author are included so that the level of expertise of the writer can be assessed. This compares to documents which are not named and it is not possible to tell if the writer has any knowledge about their subject.

Kevin Brewer BSocSc, MSc

An independent academic psychologist, based in England, who has written extensively on different areas of psychology with an emphasis on the critical stance towards traditional ideas.

A complete listing of his writings at http://psychologywritings.synthasite.com/.

CONTENTS

1. GLOBAL EARLY ADOLESCENT STUDY

1.1. INTRODUCTION

Saewyc (2017) began her editorial: "Among the social determinants that affect the health and well-being of young people throughout the world, gender is a pivotal influence, with both subtle and overt, immediate as well as longer term influences on adolescent development, resources and opportunities, and ultimately, adolescent and adult health" (pS1).

She continued: "Most societies are profoundly gendered; these gender roles and expectations affect nearly every aspect of life from infancy onward" (Saewyc 2017 pS1). But the focus has tended to be on gender development in early childhood, and ignored adolescence.

The Global Early Adolescent Study (GEAS) was set up to investigate developmental issues, like gender, in young adolescents (10-14 year-olds).

The GEAS was conducted in two phases: Phase 1 (2013-16) and Phase 2 (2017-20). The former involved 15 cities, including Baltimore (USA), Nairobi (Kenya), Shanghai (China), and Ghent (Belgium).

The aims of the GEAS include (Chandri-Mouli et al 2017):

- To understand gender socialisation in early adolescence.
- How gender norms and attitudes [1] form in early adolescence.
- How these norms and attitudes shape health

[1] Gender norms is defined as "the widely accepted social rules about roles, traits, behaviours status and power associated with masculinity and femininity in a given culture", and gender attitudes as "the individual perceptions, beliefs or endorsement of gender norms (eg: 'It's alright for a man to beat his wife')" (Kagersten et al 2016 p4).

trajectories.

1.2. REVIEW

Phase 1 of the GEAS included a systematic review (Kagesten et al 2016; appendix 1A), which identified five relevant themes (Chandra-Mouli et al 2017):

i) "Puberty is a critical time in the life course when pre-existing gender norms and attitudes becomes further crystallised".

ii) "Unequal gender norms and attitudes are widespread across geographic and socio-cultural settings, with similarities and differences across contexts".

iii) "Societal aspects of boys an girls differ as do their own gender attitudes".

iv) "Race, ethnicity, class, and immigrant status influence gender norms and attitudes".

v) "Peers and parents are key to shaping gender norms and attitudes".

1.3. FINDINGS

Blum et al (2017) summarised the key findings related to gender from the GEAS:

i) "The hegemonic myth" - "There is a global set of forces from schools, parents, media, and peers themselves that reinforce the hegemonic myths that girls are vulnerable and that boys are strong and independent. Even in sites where parents acknowledged the vulnerability of their sons, they focus on protecting their daughters" (Blum et al 2017 pS3).

ii) "Pubertal girls are the embodiment of sex and sexuality" - "Around the world pubertal boys are viewed as predators and girls as potential targets and victims. Messages such as - do not sit like that, do not wear that, do not talk to him, boys will ruin your future - support the gender division of power and affect while promote sex segregation to preserve girl's sexuality. In some places, girls come to internalise these norms to even a greater extent than boys" (Blum et al 2017 pS3).

iii) "Cover up and do not go out" - Because of the adult perceptions of female sexual vulnerability, girls are restricted in their mobility more than boys.

iv) "Boys are trouble" - Various sanctions are used to keep girls away from boys (eg: punishment, social isolation, sexual rumour).

v) Awareness of gender non-conforming peers, and the sanctions and pressures against such individuals, especially for boys.

Chandra-Mouli et al (2017) highlighted gender differences in morbidity and mortality with girls experiencing issues related to pregnancy, child-bearing, and abortion, while for adolescent boys, interpersonal violence and health-harming and risky behaviours are more common.

Lane et al (2017) spoke as representatives of of the funders of research projects like GEAS - early adolescence is "a largely unstudied phase of life, yet evidence suggests that this is an opportune time for communities to encourage the development of positive health and equitable gender norms early in life that can be transformative both immediately and over the life course" (pS10).

Chandri-Mouli et al (2017) offered a number of suggestions to promote gender-equitable norms and attitudes in early adolescence including engaging with adolescents, parenting interventions, school-based efforts, and the use of the media.

1.4. SPECIFIC COUNTRIES

Gender disparities are manifest most in societies with strong son preference, as in China and India. Basu et al (2017) reported the in-depth interviews with sixty-five adolescents from poor urban neighbourhoods in Delhi and Shanghai. A number of their parents were also interviewed (n = 58).

A key theme from India was "girls should dress appropriately, while boys have more freedom in their attire". This was summed up by a twelve year-old girl in Delhi - "Girls are not supposed to fight with their parents... They should wear proper clothes like salwar kameez (traditional Indian dress) which cover their body well. When they (girls) are small they can wear any clothes, but as girls grow up they have to wear covered clothes, talk in a certain manner" (pS26).

"Girls should behave like 'ladies' and boys should be brave and tough" was a key theme in the interviews in China. For example, a eleven year-old girl from Shanghai said - "I always cross my legs when having dinner. Then my dad patted on my leg and said I mustn't do it outside. It's not the thing a good girl should do. I asked him why he and my elder brother can do it but I can't. He replied

'because you are a girl'" (pS27).

In both places, the themes of "girls should prepare for the roles of wife and mother, while boys should concentrate on their careers", and "girls and boys should not interact" were important. In relation to the latter, a eleven year-old boy in Delhi said - "Mother and Father beats me if I talk too much with girls as I have heard that if a boy talks with a girl in our neighbourhood then the girl's father lodges a police complaint against the boy" (pS27).

Basu et al (2017) summed up: "Our findings reveal that boys and girls growing up in the same community are socialised differently during their transition from early to later adolescence. In both sites, for example, boys, in contrast to girls, spent time outside their home in undirected activities, taking advantage of the opportunity to explore their environment and develop dominant behaviours. Gender inequitable norms related to dress, demeanour, roles (education and career) and boy-girl relationships are transmitted by instruction, beating and scolding, as well as positive reinforcement and mitigation. Interactions with the opposite sex were tightly controlled for boys and girls in both countries during early adolescence. This may be due to the fear of pregnancy, which would jeopardise family honour and may put in play a series of lifelong negative physical and emotional consequences" (pS28).

1.4.1. Friendships

Al-Attar et al (2017) explored gender norms and friendships in sixty-seven interviews from Assiut, Egypt, and Ghent, Belgium. Same-sex friendships were much more common than opposite-sex ones.

For girls, "mutual trust" and "personal traits" were the important themes. In the former case, sharing secrets, and not revealing them. The key personal trait for a friend was "just like me".

"Shared values" and "defending and sharing" were the themes related to boys' friendships. In relation to the former, a thirteen year-old boy in Assiut described classmates who were not his friends - "They for example don't study, but they ask for someone to help them cheat and when they ask me, I say no" (pS32). The latter theme is seen in this quote from Ghent about a good friend - "for example when someone talks bad about me then he will say things like, 'If you ever say that again, I will go to the principal'" (pS32).

Gender norms influenced the activities that friends did together - girls talking and boys doing things and going places. A boy in Ghent said: "Boys, they can stay up late, I mean, stay outside and they can see friends a

lot... But girls... they either have to stay at home... or sometimes they can walk around with girlfriends during the day or have parties at their girlfriends' place... But, like, really staying up late outside and all, that, no. That's mostly for boys" (pS32). This fits with Mensch et al's (1998) observation: "During adolescence, the world expands for boys and contracts for girls" (quoted in Al-Attar et al 2017).

Opposite-sex friendships were limited, partly by fear of censure - eg: "Maybe I befriend a girl and someone would see me and would go tell her dad, and problems happen" (pS33).

"In both sites, but more prominently in Ghent, adolescents fear being misunderstood and teased by peers for having an opposite sex friendship. A 13-year-old boy... in Ghent said, 'Sometimes [my male friends and I] stay with girls... but then the children say like... 'yes, you're in love' or whatever, but we're not actually, we're just friends. Nothing more'" (Al-Attar et al 2017 pS33).

1.4.2. Reactions to Puberty

Bello et al (2017) compared the interviews from Ile-Ife (Nigeria) and Nairobi (Kenya) involving sixty-six adolescents and sixty-eight parents/guardians [2]. The focus of the analysis was the reaction to puberty.

Key for the adolescents was the puberty body changes, while parents/guardians were concern about these, and with preparing their child for adult responsibilities. The implications of the pubertal body changes were often to be feared by parents - eg: "like for girl she will go after boys and the boy will also go after the girls. The girl develops that desire to have boys" (mother of boy in Nairobi) (pS38).

Parents/guardians were asked about differences between their adolescence and now, and three themes emerged:

- Perceived earlier puberty of girls today - eg: "Unlike our time, at fourteen I still didn't have anything to do with boys. I started my periods at about fifteen or sixteen then, unlike now the girls start their periods very early" (mother of boy in Nairobi) (pS39).

- Providing guidance - the need to provide more than their own parents had, particularly about the physical changes experienced by girls.

[2] Most of the parent/guardian interviewees were mothers, and fathers were often unavailable.

- Influence of media and technology - "In our time, there were no phones, there was no TV and very few people owned them anyway so it was hard to see a TV... the radio was only (switched) on when the father of the house is there but when he is not there, the radio could not be switched on, it was always off. This is a big difference" (father of boy in Nairobi) (pS39).

Bello et al (2017) summed up the reactions of adolescents to puberty as "varied between anxiety, shame, and pride in their bodily changes... [But] "Unlike the findings in many other settings in Sub-Saharan Africa, parents in this study indicated a sense of personal responsibility and willingness to educate their children on pubertal changes. However, we found that this was tilted more toward the female adolescents" (pS30).

1.4.3. Romantic Relationships

De Meyer et al (2017) analysed the data from interviews with thirty adolescents in five poor urban areas (Baltimore (USA), Cuenca (Ecuador), Edinburgh (Scotland), Ghent, and Nairobi) on romantic relationships. Seven themes were identified in two stages of romantic relationships:

1. Being in love and being a couple.

i) Personal experiences - Few interviewees were in love, and so discussions were quite general.

ii) Types of relationships - Relationships were distinguished as "genuine" (mutual feelings) or without feelings. One boy from Ghent summed up the latter: "Sometimes there are also boys - and that happens a lot - that say like 'I think it's mega macho to have a sweetheart. So I'm not in love with her but I'm doing it'" (pS44). Relationships were almost exclusively heterosexual.

iii) Starting a relationship - Boys were expected and did make the "first move" - eg: "I think that a boy should do that [asking a girl out] and if he doesn't have the courage to, then I find that very cowardly. Because otherwise he won't actually stand up for you when something happens... Because otherwise it's not a boy" (girl from Ghent; pS44).

The use of force was also mentioned - eg: "They [female friends] will tell you, you accompany them to go and meet a certain boy who says he is in love with you, so if you refuse. That is when they plan [with the boy] on how you will be caught. The boy will pay some of the older boys to come and catch you" (girl from Nairobi;

pS44).

iv) Role of friends - Same-sex girl friends discussed romantic feelings, and acted as go-betweens with love messages to boys.

v) Role of parents - Adolescents reported parental disapproval of romantic relationships, particularly for girls.

2. Experience of being in a romantic relationship.

i) Activities of adolescent couples - Three behaviours were mentioned: talking, walking hand-in-hand, and sexual activities. The latter was quite rare.

ii) Negative context of romantic relationships - A few respondents, more so girls, reported negative consequences, including reputation, and sexual abuse. For example, a girl in Edinburgh said: "They [boys] could be really good looking but they could abuse you. They could do something really badly" (pS45).

De Meyer et al (2017) confirmed, as in previous research (eg: one-third of 10-13 year-olds in the USA; Carver et al 2003), that romantic relationships were "relatively uncommon", and the gender norms involved - "stereotypical masculinity norms depicting boys as romantically/sexually active and dominant, and girls as innocent with less (romantic) agency" (pS45).

De Meyer et al (2017) noted: "In spite of the similarities between the five study sites, Nairobi was unique in some respects. In comparison to the other sites, more respondents (mostly girls) referred to advanced sexual behaviour and to violence (from boys toward girls) within EAs [early adolescents] couples. Studies suggest that early sexual activity among adolescents living in the slums of Nairobi may stem from early exposure to sexual activity due to the small houses (lack of privacy for parents) and transactional sex due to high poverty levels. The reporting of violence is also consistent with the high prevalence of violence reported nationally" (pS46).

1.4.4. Resistance

Though the GEAS showed the dominance of gender norms and stereotypes, there was evidence of resistance. Yu et al (2017) explored this in 129 interviews with adolescents and 109 of their parents/guardians in Shanghai, New Delhi, Baltimore, and Ghent.

Norms were challenged in behaviour done (and clothing worn), and behaviour not done (eg: stereotypical

chores). The researchers picked out three specific examples:

a) Boys wearing nail polish - Both sexes were clear that wearing nail polish was for girls. One mother in China reported how, even her five year-old was mocked by his friends for putting polish on his toenails.

b) Girls playing football - Though there was some flexibility, playing football was traditionally seen as a "boy thing".

But "there were girls recognised as expressing both masculine and feminine characteristics across sites. In Baltimore, a mom talked about her daughter as being a tom girl [boy] as she engaged in both stereotypically feminine expressions like wearing makeup, nail polish, and doing her hair but also rejecting the stereotype: '... she just don't want to be girly, like she is a tom girl [boy]'. In Belgium, some informants noted that the fact that a girl is good at soccer 'doesn't mean she is a boy'. A similar duality was seen in Shanghai where, for example, one girl talked about liking shiny accessories and pink tops but also used the phrase tomboy referring to her participating in more stereotypical masculine behaviours like running and jumping with boys" (Yu et al 2017 pS51).

c) Clothing - Again there was some flexibility, as in girls wearing trousers, but the issue for girls was the "need to be careful in selecting their clothing; otherwise, they could be considered as 'too easy' or 'prostitutes' and become victims of violence" (Yu et al 2017 pS51).

Boys who challenged gender norms were laughed at and called names often, while the female equivalent was "tomboy". "While it was less common that girls were called names, peers, and parents commonly admonished them and had their behaviour and dress 'corrected'. When girls were called names, it was usually because of their attire being viewed as sexual, using names such as slut" (Yu et al 2017 pS52).

1.5. METHODOLOGICAL ISSUES

Mmari et al (2017) reported on the in-depth interviews with thirty adolescents and their parents/guardians each at ten sites. Key questions were asked the adolescents in order "to collect stories about changes in adolescents' interpersonal relationships as they grow up, as well how they learned about certain 'rules' and behaviours about being a boy or a girl" (Mmari et al 2017 pS15) (table 1.1).

- "Do you remember a situation where you realised that you were no longer a child and that your mum/dad was treating you differently than before?".

- "Can you tell me about when you realised that you liked a boy or a girl in a 'romantic' way?".

- "What happens to girls and boys who do not act like girls and boys, who break these 'rules'? How might people treat them?".

Table 1.1 - Some of the key open-ended questions in the qualitative interviews with adolescents.

Data were also collected from the adolescents in a "game-like" manner:

- Time-line group exercise - a small group plot the important events on a time-line since birth, and the gender differences are discussed.

- Venn diagram exercise - an individual draws circles on a piece of paper to represent their important relationships (both positive and negative), and then the interviewer explored the diagram further.

Table 1.2 lists the key strengths and weaknesses of the qualitative methods used.

Tolman et al (2017) presented a case study ("MeiMei") from the qualitative interviews of a twelve year-old girl in China when she realised she was no longer a child as her parents treated her differently.

Three researchers independently analysed the narrative and identified four themes:

a) Growing up - "The girl used to put her feet on the tea table when she was a child. One day, her father said she could not do that anymore, and her mother also convinced her that now she was an adolescent girl, it was inappropriate for her to do that. After being corrected many times by her mother, she finally learned this rule" (pS21).

b) Gender socialisation - The importance of "good manners" for a female in Chinese culture.

c) Work of gender socialisation - The father set the rules, but the mother applied them (eg: with threats and scolding).

d) Experience of gender socialisation - MeiMei initially resisted rules by retreating to her room, but in time came to accept the gender norms.

STRENGTHS	WEAKNESSES
* Interviewers in each country given full training to help obtain "richer" data. * Pilot study in each country to check the translation of wording. * Verbatim transcripts made. * "Game-like" activities built rapport.	* Abstract questions challenging for some adolescents. One interviewer in Ecuador said: "Perhaps the most complex part for younger [adolescents] are the questions about gender norms and socialisation as they did not relate to these abstract concepts and felt that 'you do not really have to learn' these rules" (pS16). * Recall of specific events dependent on memory accuracy. * Reports of adolescents being bored with long interviews. * Who was interviewing. An interviewer from China said: "The competence of the interviewer is very critical. For very young adolescents, besides the common interviewer qualifications, a good interviewer should know the popular topics which very young adolescents are interested in and have empathy with their opinions, which can help very young adolescents treat the interviewer as a friend and open up to him/her" (pS17). Similarly, reported by an interviewer in India: "The age of the interviewers was important for rapport building with very young adolescents. Young interviewers should be engaged for interviewing very young adolescents" (pS17).

Table 1.2 - Key strengths and weaknesses of qualitative method used.

1.6. APPENDIX 1A - KAGESTEN ET AL (2016)

Kagesten et al (2016) found eighty-two relevant studies published between 1984 and 2014 (of which 31 used qualitative methods, 46 quantitative, and the remainder mixed methods). Over half of the studies were performed in the USA, and a quarter in Europe.

Young adolescents' gender attitudes were shaped by the following factors:

i) Individual-level

eg: social class - adolescents from higher backgrounds expressed more equitable gender attitudes.

eg: ethnicity - the construction of "Black" and "White" masculinities, or femininity ideals.

ii) Interpersonal-level

eg: family members - gender role expectations are communicated directly and indirectly within the home.

eg: peers - male peer groups emphasise competition, toughness and heterosexual prowess, while female peers "enforce norms of beauty, appearance and heterosexual romance" (p24).

iii) Community/school level

eg: school - school rules regulate gender norms, like "appropriate length" of uniform skirts, while male athletic prowess is reinforced.

eg: media - depictions of romantic relationships in comics.

Of the 82 studies in the review, few were from low- and middle-income countries, and a limited number of longitudinal studies. "Furthermore, the vastly different outcome measures used in quantitative studies limits their generalisability. It is also difficult to draw conclusions about how individual, interpersonal and community level factors influence the construction of gender attitudes at a global level, as their influence is context specific (both between countries and within countries) including to sub-populations" (Kagesten et al 2016 p27).

1.7. REFERENCES

Al-Attar, G et al (2017) "A boy would be friends with boys... and a girl... with girls": Gender norms in early adolescent friendships in Egypt and Belgium Journal of Adolescent Health 61, S30-S34

Basu, S et al (2017) Learning to be gendered: Gender socialisation in early adolescence among urban poor in Delhi, India, and Shanghai, China Journal of Adolescent Health 61, S24-S29

Bello, B.M et al (2017) Adolescent and parental reactions to puberty in Nigeria and Kenya: A cross-cultural and intergenerational comparison Journal of Adolescent Health 61, S35-S41

Blum, R.W et al (2017) It begins at 10: How gender expectations shape early adolescence around the world Journal of Adolescent Health 61, S3-S4

Carver, K et al (2003) National estimates of adolescent romantic relationships. In Florsheim, P et al (eds) Adolescent Romantic Relationships and Sexual Behaviours: Theory, Research and Practical Implications New York: Cambridge University Press

Chandra-Mouli, V et al (2017) Implications of the Global Early Adolescent Study's formative research findings for action and for research Journal of Adolescent Health 61, S5-S9

De Meyer, S et al (2017) "Boys should have the courage to ask a girl out": Gender norms in early adolescent romantic relationships Journal of Adolescent Health 61, S42-S47

Kagesten, A et al (2016) Understanding factors that shape gender attitudes in early adolescence globally: A mixed methods systematic review PLoS ONE 11, 6, e0157805 (Freely available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157805)

Lane, C et al (2017) Why we must invest in early adolescence: Early intervention, lasting impact Journal of Adolescent Health 61, S10-S11

Mensch, B.S et al (1998) The Uncharted Passage. Girls' Adolescence in the Developing World New York: Population Council

Mmari, K et al (2017) Exploration of gender norms and socialisation among early adolescents: The use of qualitative methods for the Global Early Adolescent Study Journal of Adolescent Health 61, S12-S18

Saewyc, E (2017) Editorial: A global perspective on gender roles and identity Journal of Adolescent Health 61, S1-S2

Tolman, D.L et al (2017) Interpreting narratives within a cross-national interdisciplinary study: A case study of a collaborative process Journal of Adolescent Health 61, S19-S23

Yu, C.M.S et al (2017) Marching to a different drummer: A cross-cultural comparison of young adolescents who challenge gender norms Journal of Adolescent Health 61, S48-S54

2. UNPLEASANT MEDITATION-RELATED EXPERIENCES

"Contemplative science" is a "nascent field" that studies the psychological and neurobiological effects of meditation practices (Schlosser et al 2019).

"Much of the research output of the nascent field of contemplative science has focussed on the beneficial aspects of meditation. This narrow investigative scope has implicitly and explicitly constructed an image of meditation as a panacea for an ever-increasing host of psycho-physical ailments. However, until recently, contemporary research has paid little attention to particularly unpleasant meditation-related experiences (eg: anxiety, fear, distorted emotions or thoughts). In fact, a careful study of the literature reveals that most studies on meditation have not explored experiences that meditators would describe as particularly unpleasant or difficult" (Schlosser et al 2019 p2). Schlosser et al's (2019) attempted to rectify this shortcoming.

In terms of the limited prior research, Shapiro (1992) (which Schlosser et al (2019) described as the only prospective study on difficult meditation-related experiences) found that two of 27 participants at a vipassana meditation retreat reported negative experiences that led to their stopping meditation practice (appendix 2A).

In a larger cross-sectional study (Cebolla et al 2017) of 342 Spanish- and Portuguese-speaking meditators with at least two months meditation experience, one-quarter reported "any type of unwanted (not normally expected) or adverse reactions (with potential harm to their health) resulting from the practice of meditation" [3]. "Most effects were transitory, did not require the interruption of the meditation practice, were more likely to occur when practicing alone rather than in a group context, and were positively associated with the length of the meditation session" (Schlosser et al 2019 pp2-3).

In an even larger survey (Vieten et al 2018) of 1130 meditators, one-third admitted experiencing "disturbing feelings of fear, dread or terror" during or after meditation.

[3] The most common named experience was anxiety (including panic attack) .

Returning to Schlosser et al's (2019) study, they surveyed 1232 individuals recruited via social media (appendix 2B) [4]. The key question: "Have you ever had any particularly unpleasant experiences (eg: anxiety, fear, distorted emotions or thoughts, altered sense of self or the world), which you think may have been caused by your meditation practice?". The survey also included items from other questionnaires, like:

- Perseverative Thinking Questionnaire (PTQ) (Ehring et al 2011) - Fifteen items about repetitive negative thinking (eg: "my thoughts repeat themselves"; "I can't stop dwelling on them"; I keep thinking about the same issue all the time").

- Self-Compassion Scale (SCS) (Neff 2003) - Twenty-six items covering how individuals act towards themselves in difficult times (eg: "I'm tolerant of my own flaws and inadequacies"; "when I see aspects of myself that I don't like, I get down on myself").

Ten sessions of meditation per week was the average, with each session lasting around half an hour, and the median period of regular meditation was six years. So, the sample was regular meditators.

Overall, one-quarter of respondents indicated an unpleasant meditation-related experience (UMRE).

Religious participants (eg: Buddhist) were significantly less likely to report unpleasant experiences compared to non-religious meditators. The researchers considered the reasons for this finding - "One might surmise that meditators who explicitly identify as religious are potentially more likely to be embedded in one comprehensive, and (at least seemingly) internally consistent worldview, rather than several partially contradicting worldviews. This perceived consistency could serve as a resource for preventing or reducing the occurrence of particularly unpleasant meditation-related experiences" (Schlosser et al 2019 p9). They continued: "Relatedly, the potential buffering of religiosity on particularly unpleasant meditation-related experiences could be due to a stronger sense of community, more regular contact with fellow practitioners, and easier access to qualified meditation teachers and their guidance" (Schlosser et al 2019 p9). Alternatively, religious meditators may be less likely to report UMREs.

UMREs were reported significantly more by meditators

[4] 2599 individuals started the survey, and 1706 completed it, of which 474 were excluded for various reasons (yoga not meditation practiced; no type of meditation practice reported; less than two months experience of meditation; did not complete question about UMRE).

using deconstructive than non-deconstructive meditation practices. The former includes "insight meditation", which encourages "meditators to attune their attention to the impermanent, unsatisfactory, and impersonal nature of thoughts, feelings, and body sensations that arise within the space of awareness" (Schlosser et al 2019 p10). Non-deconstructive practices include mindfulness attention, and contemplative nurturing of acceptance (Schlosser et al 2019).

A final significant difference was that individuals who had ever attended a meditation retreat reported UMREs significantly more than non-attenders. But Schlosser et al (2019) admitted, their "data does not capture whether the particularly unpleasant meditation-related experiences happened before, during, or after a meditation retreat, or whether and how these experiences may have been linked to the unique constellation of influencing factors operating in the context of retreat practice. Retreat experience could simply be a proxy for other variables that underlie the relationship to particularly unpleasant meditation-related experiences (eg: intentions, personality). Alternatively, meditators more prone to particularly unpleasant meditation-related experiences may be more likely to attend retreats as most retreat environments offer a direct and individualised supervision by experienced teachers" (pp10-11). Some retreats can involve sleep and dietary restrictions.

High PTQ scorers (ie: high repetitive negative thinking) were slightly more likely to report UMREs than low scorers. "It could be that meditators predisposed to heightened levels of repetitive negative thinking may be more susceptible to particularly unpleasant meditation-related experiences because they lack the ability to disengage from intrusive and repetitive negative content that arises during meditation. An alternative explanation is that the very occurrence of particularly unpleasant meditation-related experiences could trigger prolonged periods of repetitive negative thinking" (Schlosser et al 2019 p10). SCS score had no relationship to UMREs.

There was "no evidence for an association between average session length, session frequency or total lifetime meditation experience and particularly unpleasant meditation-related experiences" (Schlosser et al 2019 p11).

In terms of the methodological issues, this study used one question about UMREs, and data were not collected on "the exact type of experiences or their severity and impact" (Schlosser et al 2019 p8).

The response to this key question was dependent on the honesty of the participants, not so much that they were deliberative lying, but their recall of UMREs. Schlosser et al (2019) noted that "how data regarding

particularly unpleasant meditation-related experiences are collected is likely to affect the rate of reporting. For instance, although actively prompting meditators to disclose potential particularly unpleasant meditation-related experiences might increase the rate of reporting compared to passive monitoring, medical research indicates that the estimates from active monitoring might be more accurate" (p8).

Schlosser et al (2019) also observed: "Some of the particularly unpleasant meditation-related experiences might have occurred long before the completion of the survey, whereas the participants' responses regarding their typical levels of repetitive negative thinking, mindfulness, and self-compassion, might have captured a different period" (p11).

A general problem with this research area, Schlosser et al (2019) pointed out, was that "the absence of standardised measures have likely led to an underestimation of the actual rate of particularly unpleasant meditation-related experiences, coupled with an exaggeration of their intensity, given that only extreme cases would have come to the attention of researchers and clinicians. In other words, passive monitoring in meditation research could have led to an under-reporting of particularly unpleasant meditation-related experiences" (p8). Different researchers use different terms, including "aberrant, adverse, challenging, difficult, distressing, extreme, harmful, impairing, negative, pathological, terrifying, unexpected, and unwanted" (Schlosser et al 2019 p12).

Schlosser et al (2019) did not collect data on the mental health of the participants, which was a potential confounder. They stated: "The reported prevalence estimate could therefore be more a reflection of the lifetime or 12-month prevalence of mental health problems in the general population. Relatedly, participants with high levels of anxiety and depression, for instance, could be more likely to maintain a regular meditation practice to manage their symptoms, which, without the skilful guidance of an experienced meditation teacher, could increase the likelihood of particularly unpleasant meditation-related experiences" (Schlosser et al 2019 p9).

Other methodological issues included:

- Cross-sectional data limited the ability to establish causality.
- No exploration of subjective causal attribution of UMREs.

- Little background information collected about meditation practices.

- An Internet-based survey completed between April and August 2017.

- Sample recruited from Buddhist communities, meditation centres, and mindfulness associations with a "web- or social media-presence" (table 2.1).

- Anonymous survey (table 2.2).

Advantages	Disadvantages
1. Wider sampling possible. 2. Easier and cheaper than in-person. 3. Effective in recruiting hard-to-reach populations (Topolovec-Vranic and Natarajan 2016).	1. Only individuals who use social media sites. 2. Only individuals with access to Internet. 3. Volunteers.

Table 2.1 - Advantages and disadvantages of recruiting samples via social media.

Advantages	Disadvantages
1. Willingness to divulge more and/or personal information compared to identified questionnaires (appendix 2C). 2. Greater willingness to participate. 3. Maintaining privacy, which is a principle of research ethics.	1. Less responsibility to be completely accurate as no consequences for false information. 2. No way to follow-up participants for clarification or further research. 3. Individuals still reluctant to admit to unethical, stigmatised and illegal behaviour.

Table 2.2 - Advantages and disadvantages of anonymous questionnaires.

APPENDIX 2A - SHAPIRO (1992)

The participants were 27 adults at an intensive vipassana meditation retreat in the USA [5]. The retreat lasted two weeks or three months, and involved formal

[5] This type of meditation instructs the individual to "develop a 'bare awareness', observing 'whatever comes into awareness' without judging or evaluating" (Shapiro 1992 p63).

meditation for at least ten hours per day. Data were collected before the retreat (Time 1), and one month (Time 2) and six months after the retreat (Time 3).

Significantly more positive than negative effects were reported. In terms of negative effects, seventeen individuals reported at least one, and two men stopped meditation because of the intensity of the effects.

There were four groupings of "intrapersonal adverse effects":

i) Increased negativity (eg: more judgmental).

ii) Increased disorientation (eg: "confused about who I am").

iii) Addicted to meditation (eg: "feel I am missing something between meditation retreats").

iv) Boredom and pain.

There were worsened relationships reported by three participants ("interpersonal adverse effects"), and feelings of increased alienation from society , for example ("societal adverse effects").

Methodological problems:

1. General.

- Low response rate - one-quarter of those attending one retreat centre; 13 participants completed all three questionnaires.
- Gender distribution - seventeen men and ten women.
- Small sample.

2. Specific to meditators.

"For example, one commented 'I found myself tense, angry, spaced out taking (the questionnaire) the second time (right after the retreat). I also found it painful and did not like doing it at all'. Another noted 'I am sorry to foul up your study, but I no longer feel able to make accurate generalisations about myself... one no longer knows ''what'' one ''is'' except in the moment - which makes filling out this form nigh impossible'" (Shapiro 1992 p66).

APPENDIX 2B - SOCIAL MEDIA RECRUITMENT

Concentrating on medical and health research, Topolovec-Vranic and Natarajan (2016) reviewed thirty studies recruiting samples via social media to see how it compared to traditional methods. Three issues were addressed:

i) Effectiveness of recruitment - Measured as "the number of participants recruited via social media over a given time period as compared with the other recruitment methods" (Topolovec-Vranic and Natarajan 2016 p2).

Topolovec-Vranic and Natarajan (2016) summed up: "It was found that social media was the most effective method in 12/30 studies and not the most effective method for recruiting patients in 15/30 studies. The effectiveness of social media for recruitment of study participants is highly variable and dependent on specific study characteristics such as age, whether the population is difficult to reach through traditional methods, and the method used to measure the primary outcome" (p8).

Social media was better than other Internet recruitment methods, and Facebook was the most effective social media site.

ii) Comparability of sample (eg: in demographic characteristics) - In twelve studies, the sample recruited via social media was not comparable to the general population, being younger, more White participants, more women, and higher social-economic status, for example.

Women generally are more likely to search for health information via the Internet, and so more likely to participate in health studies. Thus, "having an adequate representativeness in sex needs to be kept in mind by researchers when designing recruitment mechanisms" (Topolovec-Vranic and Natarajan 2016 p9).

iii) Cost-effectiveness - Defined by "dividing the total cost of advertisement for a particular recruitment strategy by the total number of participants recruited through that strategy" (Topolovec-Vranic and Natarajan 2016 p2).

Studies were divided.

Other issues found included:

a) Monetary incentive increased recruitment through social media.

b) The social media site used - "When recruiting a target population, it is also important to consider how that population uses social media. For instance, for young MSM [men who have sex with men], Holloway et al

(2014) noted that this population was more likely to use dating sites when meeting new sexual partners and used Facebook when communicating with individuals they already knew. Therefore, researchers interested in targeting this population for a sexual health study should use these dating sites for recruitment and use Facebook for a non-sexual health study. Some social media sites are also more popular among certain demographics – for instance, within MSM, Grindr is more popular among Whites, whereas Jack'd is more popular among African Americans" (Topolovec-Vranic and Natarajan 2016 p9).

c) The use of recruitment advertisements - "Ads on social media websites were targeted at specific age groups and locations based only on the information an individual provided on his or her profile. Therefore, there is no guarantee that awareness of the study reached all potential participants, and this could bias the results. Many studies created a separate page to recruit participants. Once again, not all potential participants may have been made aware of this page. For the studies that involved surveys, individuals could have reported false demographic information in the survey or could have given multiple responses, and verification of information on the Web remains more difficult than in person. In addition, individuals may not have correctly reported their source of recruitment, as Johnson et al (2014) noted" (Topolovec-Vranic and Natarajan 2016 p9).

d) What sites are included as "social media".

APPENDIX 2C - DISCLOSING SENSITIVE INFORMATION

A question can be sensitive for three reasons (Gnambs and Kaspar 2015):

i) Because of the taboo topic, simply asking the question is intrusive.

ii) Fear of negative consequences if others find out about an answer.

iii) Questions where certain answers conflict with prevalent social norms.

There are general factors which influence the likelihood of disclosure of sensitive information, including (Gnambs and Kaspar 2015):

a) Mode of administration - eg: self-administered (computerised or paper-and-pencil); interviewer-administered.

b) Interviewer presence or absence - eg: Tourangeau and Yan (2007) calculated an average increase of 1.3 times more reports of illicit drug use in seven studies comparing self- and interviewer-administered questionnaires.

c) Presence of others - eg: adolescents under-reported alcohol consumption when parents present at the interview.

d) Interview setting - eg: lower reports of illicit behaviours by adolescents interviewed at home than at school.

Gnambs and Kaspar (2015) performed a meta-analysis of studies comparing the same questionnaires about sensitive issues asked in computerised or paper-and-pencil form. From 48 independent samples, it was found that significantly higher prevalence rates of sensitive behaviours occurred in computerised questionnaires. The effect was stronger for highly sensitive behaviours (eg: cocaine use), but less so for moderately sensitive behaviours (eg: smoking). "Computerised surveys that were administered alone resulted in significantly higher prevalence estimates of sensitive behaviours than surveys presented to groups of respondents. Thus, traditional web-based surveys seem particularly effective for the collection of sensitive behaviours because test takers can respond alone, without fearing that others might see their responses to sensitive items" (Gnambs and Kaspar 2015 p1251).

But is more information automatically better (the "more is better" hypothesis; Tourangeau and Yan 2007)? A few studies have compared self-reports to objective criteria, and the answers seems to be positive (Gnambs and Kaspar 2015).

Anonymity via a computerised questionnaire is perceived as stronger. This may be "because people tend to underestimate objective risks of events when presented on the computer" (Gnambs and Kaspar 2015 p1252).

REFERENCES

Cebolla, A et al (2017) Unwanted effects: Is there a negative side of meditation? A multi-centre study PLoS ONE 12, 9, e0183137 (Freely available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0183137)

Ehring, T et al (2011) The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking Journal of Behaviour Therapy and Experimental Psychiatry 42, 2, 225-232

Gnambs, T & Kasper, K (2015) Disclosure of sensitive behaviours across self-administered survey modes: A meta-analysis Behaviour Research Methods

47, 1237-1259

Holloway, I.W et al (2014) Acceptability of smartphone application-based HIV prevention among young men who had sex with men AIDS Behaviour 18, 2, 285-296

Johnson, K.J et al (2014) Evaluation of participant recruitment to a rare disease online registry American Journal of Medical Genetics A 164A, 7, 1686-1694

Neff, K.D (2003) The development and validation of a scale to measure self-compassion Self and Identity 2, 3, 223-250

Resnick, D.B (2015) Bias, misconduct, and integrity in scientific research. Arras, J.D et al (eds) The Routledge Guide to Bioethics New York: Routledge

Schlosser, M et al (2019) Unpleasant meditation-related experiences in regular meditators: Prevalence, predictors, and conceptual considerations PLoS ONE 14, 5, e0216643 (Freely available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0216643))

Shapiro, D (1992) Adverse effects of meditation: A preliminary investigation of long-term meditators International Journal of Psychosomatics 39, 1-4, 62-67

Topolovec-Vranic, J & Natarajan, K (2016) The use of social media in recruitment for medical research studies: A scoping review Journal of Medical Internet Research 18, 11, e286

Tourangeau, R & Yan, T (2007) Sensitive questions in surveys Psychological Bulletin 133, 859-883

Vieten, C et al (2018) Future directions in meditation research: Recommendations for expanding the field of contemplative science PLoS ONE 13, 11, e0205740 (Freely available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0205740)

3. SIX CHALLENGES TO TRADITIONAL VIEWS

3.1. BRAIN AND IMMUNE SYSTEM

Traditional view

The brain and the immune system do not physically interact, except in certain cases of pathology.

For example, through work with mice, it was found that in a condition similar to multiple sclerosis, peripheral immune cells make a protein that allows penetration of the blood-brain barrier (Kipnis 2018/2019).

Because of the blood-brain barrier, the brain was viewed as "immune privileged" (Peter Medawar quoted in Kipnis 2018/2019) (ie: "impervious to the immune system"; Kipnis 2018/2019).

New idea - Neuroimmunology

Working with rats and mice with spinal cord injuries, the central nervous system (CNS) (brain and spinal cord) was found to contain immune cells, and "eliminating immune cells after injury to the CNS worsens neuron loss and brain function, whereas boosting the immune response improves neuron survival" (Kipnis 2018/2019 p7).

Not only is evidence emerging that the immune system helps the injured CNS, it may also play a role during psychological stress.

Kipnis (2018/2019) reported his work which stressed mice in a maze with the smell of a predator. The stress response leads to hiding rather than exploring, but most mice forget within hours, and subsequently explore the maze. Around one-tenth of mice do not forget and they are used as models for post-traumatic stress disorder (PTSD). Mice genetically engineered to lack certain immune functions are more likely to be the latter. This suggests that the immune system plays a role in stress (Kipnis 2018/2019).

Kipnis (2016) found that mice without adaptive immunity (eg: T cells) perform worse than healthy

controls on learning and memory tasks, Such mice also have poorer social behaviour, preferring to spend time with objects than other mice (Kipnis 2018/2019).

Other work in neuroimmunology includes the coining of the term "glymphatic system" (Maiken Nedergaard quoted in Kipnis 2018/2019) to describe the work of the lymphatic system in the CNS.

3.2. NEURONS

Traditional view

Neurons communicate by electrical signals.
First recorded by Hodgkin and Huxley (1952). The electrical signal is created by the movement of charged sodium and potassium atoms through the membrane wall of the neuron (known as Hodgkin-Huxley model).

New idea

The signals are mechanical (not electrical) - ie: a compression wave, like sound, which temporarily changes the fatty membranes on the pipe-like nerve fibres from fluid to crystalline. The electrical pulses seen in neurons are the side effects of the physical shock wave (Fox 2018/2019).
This is the idea of physicist, Thomas Heimburg (eg: Heimburg and Jackson 2005), developing on work by Ichiji Tasaki (eg: Tasaki 1979), and later Matthias Schneider (eg: Shamit and Schneider 2014).

Most biologists view the mechanical wave as the side effects of an electrical pulse, but a few of them have accepted that the two actions (electrical and mechanical) "might work in concert" (Fox 2018/2019 p24).

3.3. NEOLITHIC PEOPLES

Up to around 5000 years ago (YA), Neolithic Europe was inhabited by farmers who worked together (eg: to build monuments like Stonehenge). In the following one thousand years, these peoples were replaced by livestock herders called the Yamnaya, who came from the Eurasian steppe (Barras 2019a).
Appearing around 5000 YA the "Corded Ware" people of Northern Europe showed adoption of Yamnaya customs, and this was seen as the movement of ideas. But DNA analysis (eg: Haak et al 2015) suggested that the Corded Ware people were the "offspring" of the Yamnaya (Barras 2019a).

Other studies have suggested that the peoples of Neolithic Northern Europe were in decline as early as 5700 YA, with plague being a possible cause among close-living communities, and they may have early disappeared by 5400 YA (Barras 2019a).

So, weakened populations were vulnerable to migrating, mostly male, Yamnaya, who were quite violent. But the basis for the idea of young warriors moving though Europe is based on "evidence snatched from a few isolated sites" (Barras 2019a).

3.4. FORM AND FUNCTION

Paleontologists tend to infer function from form. So, the form/shape of a bone is taken as evidence of its evolved function - as in teeth and food choice. For example, Paranthropus (2.7 - 1.2 million years ago - Plio-Pleistocene era) had big, flat, thick-enamelled pre-molars and molars, heavy jaws, and a skull that suggested powerful chewing muscles (cranio-dental functional morphology), which would work for grinding hard dry plants and crunching nuts ("hard-object feeder"; Ungar et al 2008). Homo fossils, however, show "daintier teeth and jaws" which was assumed to link to meat eating (Ungar 2018/2019).

However, the specialised anatomy is not necessarily a sign of a particular diet (ie: form does not necessarily tell about function). For example, Ungar et al (2008) analysed micro-wear (on seven teeth specimens from museums in East Africa) of Paranthropus boisei (ie: the damage to teeth caused by long-term diet) [6], and found no evidence of hard food [7]. There was light micro-wear (ie: fine striations on the surface), not deep pits expected of hard-object specialists. In fact, this species was eating grass and sedge (grinding) with teeth and jaws evolved for crushing. Climate change meant that early hominin ate what was available (Ungar 2018/2019) [8].

---

[6] "Patterns of dental micro-wear reflect the physical properties of foods eaten. Thus, primates that consume hard, brittle foods tend to have heavily pitted, complex micro-wear surface textures, whereas those that eat tough leaves or stems have more anisotropic surfaces dominated by long, parallel striations" (Ungar et al 2008 p1).

[7] Ungar et al (2008) stated that "cranio-dental functional morphology offers insights into what a hominin could have eaten, but not necessarily what it actually ate on a regular basis. By contrast, dental micro-wear, the pattern of microscopic use-wear on a tooth, is caused by, and reflects, specific foods eaten by the individual whose teeth are being examined. Thus, micro-wear can provide direct evidence for the diets and foraging strategies of fossil species" (p1).

[8] "Liem's Paradox", "originally developed from studies of fish, states that specialised morphology can allow for a broader diet wherein a species may actively avoid the very foods to which it is adapted when other, more preferred resources are available" (Ungar et al 2008 pp1-2).

3.5. HOMOSEXUALITY AND PSYCHOLOGICAL PROBLEMS

"Through most of the last hundred years, the prevailing notion was that homosexuality was an illness" (Masters et al 1995 p385) [9]. For example, Freud linked homosexuality to the Oedipal complex, while early 20th century surveys of homosexuals in prisons found more psychological problems that straight inmates. Individuals visiting psychiatrists were also used, and "it was almost certain that this type of sampling would lead to the unwarranted conclusion that homosexuals are mentally ill" (Masters et al 1995 p385).

But Hooker (1957) was the first (Masters et al 1995) to sample heterosexual and homosexual from the general population. Her sixty participants completed a range of personality tests, which were then scored by experts blind to the sexual orientation of the test-taker. It was not possible to distinguish between heterosexual and homosexual individuals in terms of psychological problems (Masters et al 1995).

3.6. HOMININS

Traditional view

Hominins (which includes modern humans, extinct humans like Neanderthals, and immediate ancestors like australopiths) evolved in Africa (Barras 2019b).

New Idea

Hominins evolved in Europe. David Begun found fossilised parts of a jaw in northern Greece which suggested an animal that represented the ancestral group that hominins evolved from. This animal from 8-9 million years ago (MYA) gave rise to Graecopithecus 7.2 MYA (Fuss et al 2017) ("proto-hominins") (Barras 2019b).

But the superficial similarity in jaws may not mean these species were related to primates (Yohannes Haile-Selassie in Barras 2019b).

[9] Such views today may be called "homophobia", which is a term with varied definitions, but, for clarity, Masters et al (1995) defined it as "obsessive hostility and fear around homosexuals" (p385). Pelligrini (1992) talked of "homophobias", seen in four ways - men towards gay men, men towards lesbians, women towards lesbians, and women towards gay men (Masters et al 1995). Hudson and Rocketts (1980) designed the Index of Homophobia (IHP) (appendix 3A).

3.7. APPENDIX 3A - INDEX OF HOMOPHOBIA

- I would feel comfortable working closely with a male homosexual.
- I would be comfortable if I found myself attracted to a member of my sex.
- If I saw two men holding hands in public I would feel disgusted.
- I would feel disappointed if I learned that my child was homosexual.

(25 items, each scored 1-5; maximum 125; >75 homophobia)

(Source: Masters et al 1995)

Table 3.1 - Items from Index of Homophobia.

3.8. REFERENCES

Barras, C (2019a) History of violence New Scientist 30th March, 29-33

Barras, C (2019b) Did hominins evolve in Europe? New Scientist 20th April, p12

Fox, D (2018/2019) The brain reimagined Scientific American Winter (special edition), 22-29

Fuss, J et al (2017) Potential hominin affinities of Graecopithecus from the Late Miocene of Europe PLoS ONE 12, 5, e0177127 (Freely available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0177127)

Haak, W et al (2015) Massive migration from the steppe was a source for Indo-European languages in Europe Nature 522, 207-211

Heimburg, T & Jackson, A.D (2005) On soliton propagation in biomembranes and nerves Proceedings of the National Academy of Sciences, USA 102, 28, 9790-9795

Hodgkin, A.L & Huxley, A.F (1952) A quantitative descriptive of membrane current and its application to conduction and excitation in nerve Journal of Physiology 117, 4, 500-544

Hooker, E (1957) The adjustment of the male overt homosexual Journal of Projective Techniques 21, 1, 18-31

Hudson, W.W & Ricketts, W.A (1980) A strategy for the measurement of homophobia Journal of Homosexuality 5, 4, 357-372

Kipnis, J (2016) Multi-faceted interactions between adaptive immunity and the central nervous system Science 353, 766-771

Kipnis, J (2018/2019) The seventh sense Scientific American Winter (special edition), 4-11

Masters, W.H et al (1995) Human Sexuality (5th ed) New York: Harper Collins

Pelligrini, A (1992) S(h)ifting the terms of hetero/sexism: Gender, power, homophobias. In Blumenfeld, W.J (ed) Homophobia: How We All Pay the Price Boston: Beacon Press

Shamit, S & Schneider, M.F (2014) Evidence for two-dimensional solitary sound waves in a lipid controlled interface and its implications for biological signalling Journal of the Royal Society Interface 11, 97, 20140098

Tasaki, I (1979) Chemical and electrical receptors on the surface of

squid giant axons Brain Research Bulletin 4, 1, 190-192

Ungar, P.S (2018/2019) The real paleo diet Scientific American Winter (special edition), 31-37

Ungar, P.S et al (2008) Dental microwear and diet of the Plio-Pleistocene hominin Paranthropus boisei PLoS ONE 3, 4, e2044 (Freely available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0002044)

4. NOISE POLLUTION IS UNFAIR

There is a "well-established linkage" between noise pollution and health problems (Collins et al 2019) [10].

But for children there is also the risk of behavioural problems, cognitive and developmental deficits, and impairments in skills with prolonged exposure to noise pollution (Collins et al 2019) [11].

Noise pollution exposure, however, is not evenly distributed, and there is a social disparity - ie: greater exposure among lower socio-economic status (SES) individuals, and ethnic minority members. Studies have been performed in Montreal (Canada), Hong Kong, Birmingham (England), and the Ile-de-France region (France), for example (Collins et al 2019) [12].

But limited research in the USA [13]. So, Collins et al (2019) examined noise pollution exposure among children in relation to ethnicity and SES based on the school attended as the unit of analysis. They used US Department of Transportation data for 2014-15, and Department of Education on schools. The former was an estimate of noise over 24 hours based on actual sampling of sound level, but mostly calculations from annual daily traffic (ie: number and type of vehicles using the road and their speed). The Department of Education data recorded ethnicity of students, and eligibility for free or reduced price school meals (used as a proxy for economic deprivation).

A category of "highly exposed" to road and aviation noise was created to cover the top 10% of road noise exposure, or with daily average aviation noise above 35 dBA.

Students attending "highly exposed" schools were significantly more likely to be receiving school meals, and to be non-White. For example, nationwide in the USA 52% of the sample were eligible for free school meals, but 59% of that group attended "highly exposed" schools (figure 4.1).

The simple explanation for the findings was that child these children were more likely to live in environments close to busy roads and airports. Collins et al (2019) explained: "These exposures likely relate to

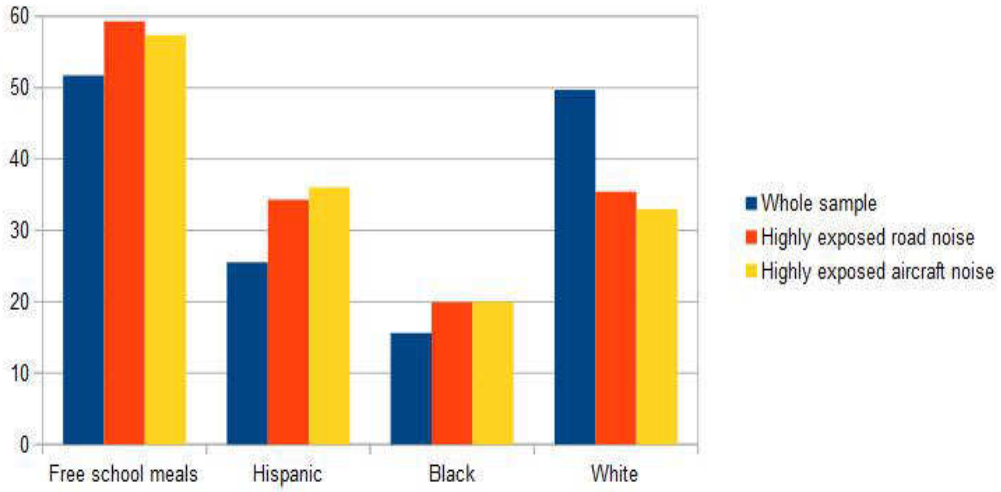
---

[10] For example, high blood pressure, cardiovascular diseases, diabetes, sleep loss, and anxiety and depression (Collins et al 2019).

[11] "Noise exposure has been linked to worse academic performance in children based on standardised tests of memory, processing, motivation, verbal communication, reading ability, and mathematics in studies that account for other factors known to influence school achievement" (Collins et al 2019 p257).

[12] Tonne et al (2018) was an exception with the findings that exposure to aviation noise was associated with higher income neighbourhoods.

[13] For example, Casey et al (2017) found significantly more non-White and low-income children living in high noise areas of the Twin Cities, Minnesota metro area.



(Data from table 2 p262 Collins et al 2019)

Figure 4.1 - Proportion of children (%).

the well-documented history of racially discriminatory locational decisions regarding the development of post-WWII transportation infrastructure in the US, whereby Federal Interstate Highway System routes and airport flight paths, for example, targeted minority neighbourhoods... The contemporary racial/ethnic inequalities in exposure to noise from road and aviation transportation sources found here may in part represent legacies of those past injustices" (p263).

The study used official data for noise in the vicinity of the schools, so it "did not completely capture children's daily noise exposure, as home exposures and other sources of noise (eg: railways, industrial sources) were not included. The study focused on the year 2014, due to availability of noise estimates..." (Collins et al 2019 p263).

Noise measures were taken outside the school usually, rather than for actual schoolyard areas", and "does not model the attenuation of noise due to barriers and terrain, meaning that road noise may be overestimated near highway barriers or natural shielding features (eg: berms). It does not consider the quality of nearby structures, which influences the level of noise experienced inside buildings. This means that we are likely underestimating the noise exposure among children from socially disadvantaged backgrounds, as they presumably have an increased likelihood of attending school in relatively poor quality built structures (eg: without triple-paned windows or sound insulation) where they may experience increased exposures to noise indoors"

(Collins et al 2019 p264) [14].

The estimates of noise were 24-hour averaged. "Because children are only present at schools during the day, it would have been ideal to examine average daytime rather than 24-h road and aviation noise metrics, as 24-h average noise metrics presumably underestimate daytime noise at school locations from transportation sources" (Collins et al 2019 p264).

REFERENCES

Casey, J.A et al (2017) Race/ethnicity, socio-economic status, residential segregation, and spatial variation in noise exposure in the contiguous United States Environmental Health Perspectives 125, 7, 077017

Collins, T.W et al (2019) Social disparities in exposure to noise at public schools in the contiguous United States Environmental Research 175, 257-265

Sharp, B.H & Collins, T.L (2014) Assessing Aircraft Noise Conditions Affecting Student Learning Washington DC: Transportation Research Board of the National Academies

Tonne, C et al (2018) Socio-economic and ethnic inequalities in exposure to air and noise pollution in London Environment International 115, 170-179

[14] In an experiment, Sharp and Connor (2014) found that sound insulation installed at schools reduced aviation noise and its negative effects.