

Sidney De Haan 
Research Centre for Arts and Health

Singing and Health:

*Summary of a Systematic Mapping
and Review of Non-Clinical Research*

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Sidney De Haan Research Centre for Arts and Health

The Sidney De Haan Research Centre for Arts and Health is committed to researching the contribution of music and other participative arts activities in promoting the wellbeing and health of individuals and communities.

Current objectives include:

- Undertaking scientific research and evaluation on the potential benefits for wellbeing and health of active engagement in music making.
- Documenting and providing the research evidence base for establishing 'Singing on Prescription' for its wellbeing and health benefits
- Working in partnership with health and social care agencies and service users in the South East of England to promote the role of music and arts in healthcare and health promotion
- Contributing to the wider development of the field of Arts and Health research and practice through membership of national and regional networks, publications and educational activities

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Rosalia Staricoff and Christine Whitmore
with Ian Morrison and Matthew Raisbeck***



Background

Music is one of the defining features of our human nature, and singing is a form of musical participation and expression open to everyone. It is therefore of interest to consider the available evidence on individuals' experiences when they sing, and whether singing is beneficial for wellbeing and health.

The origins of the Sidney De Haan Research Centre for Arts and Health lie in a small-scale exploratory study carried out by Clift and Hancox (2001) on the perceived benefits of singing held by choral singers. In planning their initial study, the authors conducted a literature search but found very little previous research on singing and wellbeing. Since then, however, interest in this issue has grown. As part of a programme of research on singing planned within the Centre, it was considered essential to undertake a systematic review of the scientific evidence on the value of singing for wellbeing and health.

The aims of this study were: to systematically identify existing published research on singing, wellbeing and health; to map this research in terms of the forms of singing investigated, designs and methods employed and participants involved: to critically appraise this body of research, and where possible synthesise findings. The hypothesis underpinning this review was that singing, and particularly group singing, has a positive impact on personal wellbeing and physical health.

Identifying sources for this review

For the purposes of this review, a search was undertaken of ten bibliographic sources using a carefully selected set of search terms organised into three groups: health, music therapy and singing. The strategy adopted was to start with Medline, Embase, Cinahl and Psycinfo as the sources most likely to identify relevant published research. The search was confined to papers published in English, with no restriction on date of publication. A total of 233 papers were identified from these sources. It was decided at this stage that clinical studies in which singing served as a form of therapeutic intervention for some specific health issue were best considered in a second review, and 16 non-clinical studies were judged to be of interest on the basis of abstracts. Further searching of ERIC, ASSIA, RILM, Cochrane Library, Music Therapy World and Google Scholar, produced in excess of 800 references, but only four additional papers of interest were identified.

A further search strategy involved examining the references given in each of these papers, and this identified a further nine sources of interest. An attempt was also made to contact the authors of papers identified to locate further published material, giving a further five sources. A range of additional, often serendipitous routes served to identify a further 20 papers of potential interest, giving a final total of 54 sources.

These papers were read independently for content and quality by two members of the research team, and a process of categorisation and pruning led to a final selection of 35 papers for systematic mapping and review (these are listed in the references section). Studies were grouped as follows: qualitative studies; studies using specifically designed questionnaires, quantitative studies using previously validated scales; studies making objective measures of physiological changes associated with singing (e.g. hormonal changes); studies employing well established measures of 'mental and physical health'; research assessing physical performance (i.e. hearing and lung function) of singers, and finally, large scale epidemiological studies in which choral singing was included as a potential determinant of health.

An overview of the corpus of studies

At this stage, it was very apparent that research interest in singing, wellbeing and health is relatively recent. The earliest paper identified was published in 1960, and most appeared in the late 1990s and beyond. Also, the papers identified are highly variable in terms of problem addressed, character of singing investigated, participants involved, and methods of data gathering and analysis. Many of the qualitative studies are exploratory in character and involve very small samples. This is especially true of the early studies reported by Joyce (1996), Smithrim (1998), Adams (2000) and Patteson (2000). Most of the more quantitative studies involving surveys or quasi-experimental designs are also small in scale. In addition, the quality of reporting varies with some reports lacking essential details.



Citation mapping within the corpus of sources shows little evidence of progressive development in the sense that few researchers refer to and build upon previously published research. Some of the most recently published studies, for example, make little reference to previous studies, even where they are clearly relevant (e.g. Louhivouri, Salminen and Lebaka, 2005; Cohen, Perlstein, Chapline, Kelly, Firth and Simmens, 2006, 2007).

The character of singing investigated in the studies under review also shows wide diversity, with some studies concerned with group or choral singing and others with individual singers; some studies with amateur or professional singers or both, and some with existing singing groups of long standing or with singing groups set up specifically for research purposes. Interestingly, studies vary considerably in the level of detail provided of the singing investigated, with some reports giving little or no account and others offering quite detailed descriptions.

Twenty reports have a focus on singing in groups. An interesting aspect of these studies is that while a few are concerned with single sex groups (Ashley, 2002; Bailey and Davidson, 2002; Silber, 2005) in most, female participants outnumber males by approximately 3:1, and in some studies the imbalance is even greater. Interestingly, only one study specifically considers the factor of 'gender' in relation to its findings (Clift and Hancox, 2001) and reports a significant sex difference in perceived benefits associated with singing. It is clear, therefore, that research in this field is affected by a considerable bias towards females, which should be taken into account in considering any of the findings highlighted in this review.

Benefits associated with singing

With respect to the possible benefits associated with singing, the studies reviewed fall into two main groups.

Firstly, there are those studies which adopt an exploratory, qualitative approach and gather information by asking singers to give accounts of their experience of singing and its personal value for them, through interviews, group discussion and written answers on questionnaires (e.g. Joyce, 1996; Smithrim, 1998; Clift and Hancox, 2001 (study 1); Bailey and Davidson, 2002, 2005; Sandgren, 2002). In a few studies, such data is placed in the context of broader ethnographic observation and / or a working knowledge of the participants in the study (e.g. Ashley, 2002; Silber, 2005). Closely associated with these studies are those which gather essentially descriptive data through structured questionnaires (Wise, Hartmann and Fisher, 1992; Hills and Argyle, 1998a,b; Beck et al., 2000; Clift and Hancox, 2001 (study 2); Hilman, 2002; Bailey and Davidson, 2003).

Secondly, there are those studies which adopt a hypothesis-testing approach based on the use of previously validated measures of mood, wellbeing or health (e.g. Unwin, Kenny and Davis 2002; Kreutz, Bongard, Rohrmann, Grebe, Bastian and Hodapp, 2004; Cohen et al., 2006, 2007); objective measures of biological or physiological functioning assumed to be associated with emotional state (Galati, Costa, Rognoni and Pisterzi, 2006) or subjective experiences of wellbeing (Beck, Cesario, Yousefi and Enamoto, 2000; Grape, Sandgren, Hansson, Ericson and Theorell, 2003; Beck, Gottfried, Hall, Cisler and Bozeman, 2006), and objective indicators of some aspect of bodily function directly affected by singing (e.g. hearing or lung function) (Heller, Hicks and Root, 1960; Gould and Okamura, 1973; Schorr-Lesnick, Teirstein, Brown and Miller, 1985; Steurer, Simak, Denk and Kautzky, 1998).

In addition, two large-scale epidemiological surveys in Sweden and Finland have included singing in choirs as a possible health determinant (Bygren, Konlaan and Johansson, 1995; Konlaan, Bygren and Johansson, 2000; Johansson, Konlaan and Bygren, 2001; Hyyppä and Mäki, 2001).

Benefits identified by qualitative and questionnaire studies

In relation to the first set of studies, a number of recurrent themes can be identified in the qualitative and descriptive data reported. Namely, that the experience of singing, and particularly singing in a group, has the following perceived benefits:

- Physical relaxation and release of physical tension
- Emotional release and reduction of feelings of stress
- A sense of happiness, positive mood, joy, elation and feeling high
- A sense of greater personal, emotional and physical wellbeing
- An increased sense of arousal and energy
- Stimulation of cognitive capacities – attention, concentration, memory, learning
- A sense of being absorbed in an activity which draws on multiple capacities of the body and the mind
- A sense of collective bonding through coordinated activity following the same pulse
- The potential for personal contact with others who are like-minded and the development of personal supportive friendships and constructive collaborative relationships
- A sense of contributing to a product which is greater than the sum of its parts
- A sense of personal transcendence beyond mundane and everyday realities, being put in touch with a sense of beauty and something beyond words, which is moving or good for the soul
- An increased sense of self-confidence and self-esteem
- A sense of therapeutic benefit in relation to long-standing psychological and social

problems (e.g. depression, a history of abuse, problems with drugs and alcohol, social disadvantage)

- A sense of contributing to the wider community through public performance
- A sense of exercising systems of the body through the physical exertion involved in singing – especially the lungs
- A sense of disciplining the skeletal-muscular system through the adoption of good posture
- Being engaged in a valued, meaningful, worthwhile activity that gives a sense of purpose and motivation

In addition to identifying a wide range of possible benefits, attempts have also been made to organise such a list conceptually and empirically. The most significant conceptual work in this regard has been undertaken by Bailey and Davidson (2002, 2005). They present a model of ‘the positive effects of participation in group singing’ based on studies of members of two choirs for disadvantaged adults and a small sample of middle class choristers. This suggests four principal groups of benefits: clinical-type benefits; social benefits; benefits associated with public performance, and cognitive stimulation. They argue that the therapeutic benefits were widely reported across the samples investigated, but other benefits varied to some extent according to social circumstances.

Interestingly, this model overlaps to some extent with the results reported by Clift and Hancox (2001) from their second survey. Factor analysis of data from a structured questionnaire produced six factors, which they label as: wellbeing and relaxation; breathing and posture; social benefits; spiritual benefits, emotional benefits and heart and immune system benefits. The first factor (together with the fourth and fifth) corresponds closely with the first and fourth component of the Bailey and Davidson model, and the third social factor in Clift and Hancox clearly links with the second social component in Bailey and Davidson.



Similar correspondence can be seen with the results reported by Hills and Argyle, especially in their 1998a paper. They identify five factors from their musical experience scale, which they label as: wellbeing, mystical experience, social, entertainment and intellectual / musical. Clearly, the first factor corresponds with the first component of the Bailey and Davidson model and the first factor in Clift and Hancox. Factors two and three in Hills and Argyle correspond with similar factors in Clift and Hancox. Their factor five also clearly aligns with the component of cognitive stimulation suggested by Bailey and Davidson.

Benefits examined in quantitative hypothesis-testing studies

Singing and mood

A number of studies have explored the hypothesis that singing generates positive feelings through the use of previously standardised questionnaires designed to assess mood (Rider, Mickey, Weldin and Hawkinson, 1991; Valentine and Evans, 2001; Unwin et al., 2002; Kreutz et al., 2004). In each of these studies, the questionnaires were used to assess mood before a period of singing and then immediately afterwards. Despite the fact that the hypothesis under test is essentially the same in each case, the studies are difficult to compare as they differ in the mood questionnaire employed, and the characteristics of the singing and participants involved. In addition, the possibility of significant demand characteristics and the conceptual problem of linking short-term and slight changes in mood to broader notions of wellbeing and health raise serious questions over the scientific value of these studies.

The best designed and most relevant study is that reported by Kreutz et al. (2004), and their results do appear to show a significant effect of singing on mood compared with a listening to singing condition. However, close scrutiny of their findings shows that this change is small, compared with a significant and large shift in negative mood state when singers are asked to listen to a recording of choral singing rather than to sing themselves!

Singing and biological / physiological variables

An obvious attraction of studies which attempt to assess the impact of singing on biological or physiological variables is that they offer the promise of 'objective' knowledge. In addition, they may contribute to the development of a theoretical model of the underlying processes through which the activity of singing generates positive feelings and also influences the physical functioning and health of the body. There is also a sense that such objective measures are less likely to be influenced by study demand characteristics, although decades

of research demonstrating the reality of placebo effects in clinical pharmacological trials, clearly contradicts any assumption that physiological parameters are immune to psychological or social influence! (See Wootton, 2007)

A clear area of interest pursued in a number of studies is the connection between singing and stress. This actually has two aspects to it. The first is that singing itself can be experienced as stressful, particularly when the material being sung is difficult to master, and there are the additional pressures of public performance. Given that it is well known that the experience of stress is mediated by the sympathetic nervous system and the endocrine system, it follows that increases are likely to be found in key hormones involved in the stress response when singers engage in performance. Interestingly, however, none of the studies surveyed which explore physiological parameters in relation to singing, consider the distinction between 'eustress' and 'distress' – in other words, between 'positive' stress, which is important in motivating performance to a high standard, and 'negative' stress which arises when the demands of a task or situation are perceived to be greater than coping resources. The second stance that can be taken in thinking about the relationship between singing and stress, is that singing can be relaxing and calming, and may counteract pre-existing feelings of being stressed. From this perspective, one could predict that singing would be associated with a lowering of stress hormones.

Both of these positions are illustrated in the study by Beck et al. (2000) in which cortisol levels were assayed in choral singers before and after rehearsals and performance. For rehearsals, cortisol levels reduced, whereas under performance conditions, cortisol levels increased. However, Kreutz et al. (2004) found no changes in cortisol associated with a choral rehearsal; Beck et al. (2006) found no changes associated with individual singing lessons or performances, and Grape et al. (2003) report that cortisol increased for men after a singing lesson, but decreased for women. Overall, therefore, the picture for cortisol changes is somewhat complex, and general conclusions are difficult to draw.

The picture for salivary immunoglobulin A (sIgA) appears to be a little clearer. Five studies have assayed sIgA before and after singing (Rider et al., 1991; Beck et al, 2000, 2006; Kuhn, 2002; Kreutz et al., 2004;), and four of these studies suggest that group singing is associated with increased secretion of this anti-body in saliva (the exception is Rider et al., 1991). As sIgA is part of the immune system which offers 'frontline' defence in mucosal membranes against infection, these findings appear to have some relevance for the health of individual singers. Such a conclusion would be premature, however, given the limitations of the studies. In particular, there is no evidence that such changes measured immediately after singing are sustained, and no evidence that they have any clinical significance. The causal mechanisms involved in generating the changes are also obscure, and it may well be that increased levels of immunoglobulin are caused not by singing per se, but by the heightened level of stress involved in singing or the fact of being in close proximity of other people who are breathing energetically, and exhaling potentially infectious organisms!

Singing and measures of mental and physical health

Only two quasi-experimental studies have been reported in which the effects of singing on standardised and objective measures of wellbeing and health are assessed (Houston, McKee, Carroll and Marsh, 1998; Cohen et al., 2006, 2007). In the former study, a four-week 'old time sing-a-long' programme was set up in 3 residential care homes, with 3 homes acting as non-intervention controls. Participants completed two well-known health questionnaires before and after the intervention – the Hospital Anxiety and Depression Scale and the General Health Questionnaire-28. It should be noted, however, that while singing was a central part of the activity established in the project, the focus of the researchers' attention was on the potential of singing funny songs in generating laughter, which they saw as the active ingredient in the intervention. In the Cohen et al. study, a fairly large community chorale was established for retired people living independently, with a similar number of non-participating community members acting as a comparison

group. A range of measures was administered before the start of the intervention, and then again after one and two years.

In both cases, positive findings are reported which appear to suggest that involvement in group singing activity had a positive impact on measures of both mental and physical health. These studies are among the best pieces of research available to date which have attempted directly to assess the value of singing for health. Nevertheless, both studies have limitations.

The first is the fact that both employ non-equivalent group designs. Although both research teams present data to suggest that the intervention and control groups were comparable at baseline, it remains the case that additional factors could have produced the differences observed between the groups at post-test.

Secondly, the participants themselves were clearly aware of whether they were participating in the intervention or were in the control arm of the study, and as such, they might well have developed their own assumptions regarding the purpose of the research, and the outcomes anticipated by the researchers. Under these circumstances, the study results are likely to have been affected by study 'demand characteristics.' To their credit, Houston et al. (1998) recognise this possibility, but Cohen et al. (2006, 2007) do not.

Thirdly, both studies are fairly small in size and given the small to medium effect sizes involved for the measures employed, it is clear that both are substantially underpowered. Neither study provides any indication that issues of effect sizes and power guided decisions about sample sizes employed.

Finally, both studies rely on tests of statistical significance in drawing conclusions about the effects of their interventions on health, but neither seriously addresses the question of whether the changes observed are substantively or clinically significant. This issue is particularly important for measures of depression employed in both studies, as no clear indication is given that any of the participants was affected by real feelings of depression prior to the intervention. In addition, neither study clearly demonstrates that the mean

changes observed in the intervention groups represent a clinically significant shift away from depression.

Singing, lung function and hearing

Singing as an activity involves the singer using their own bodies as an instrument. In common with all other musical instruments, this involves three components – a sound source, a sound resonator and a sound radiator (Titze, 2008). It is surprising, therefore, that so few studies have explored the implications of this fundamental fact about singing, and assessed the extent to which the exercise of the basic structures and mechanisms intrinsically involved in singing might lead either to improvements in the fitness and so health of the systems involved, or to possible damage.

The power for the sound source (the larynx) clearly comes from the lungs – and it follows that one might expect that active involvement in singing may have effects on the structure and function of the lungs and the larynx. It is also obvious that singers produce sound, and that singers in a group can produce quite a substantial volume of sound. There is thus a possibility that regular exposure to high levels of sound produced by a choral singing group may have effects on the structure and functioning of the auditory system. As with the issue of physiological changes associated with singing, research on these questions is attractive given that objective measures are possible. Given also that any structural or functional changes would have to be a result of factors operating over a substantial period of time, it is difficult to see how their assessment could be affected by psychological or social demand characteristics in any study.

Both issues have received research attention, but it is remarkable that so little research has been undertaken. The three earliest studies identified in this review explored the idea that professional singing would lead to a measurable improvement in lung function (Heller et al, 1960; Gould and Okamura, 1973; Schorr-Lesnick et al., 1985). The best of these (Schorr-Lesnick et al.) appears to have dismissed the idea as ‘a myth’ so conclusively that no further research has been undertaken on this subject. Given the lack of evidence for

professional singers, it seems unlikely that amateur singing, whether on an individual or group basis, would have much impact.

Similarly, only one early study has investigated whether being part of a professional chorus might affect hearing. Steurer et al. (1998) demonstrate hearing damage, in the sense of higher auditory thresholds, across a wide frequency range. There are some puzzling features of their study, such as the failure to find any relationship between length of career and time devoted to singing and hearing thresholds, which call for further investigation. It is also an open question whether such effects would be detected among amateur choral singers.

Both the Schorr-Lesnick, et al. and Steurer et al. studies clearly give pause for thought in relation to the general hypothesis guiding this review – that participation in group singing has benefits for wellbeing and health. In the former case, effects which might be expected - and which as Clift and Hancox (2001) found, were believed to be true among choral singers themselves – are not in fact supported by the evidence. And in the second case, the evidence of raised hearing thresholds raises the possibility that group singing is not necessarily entirely beneficial, but may in fact lead to bodily damage.

Epidemiological research with singing as a health determinant

Two large-scale Scandinavian studies of population health (in Sweden: Bygren, Konlaan and Johansson, 1996, and in Finland: Hyyppä and Mäki, 2001) were also considered relevant to the current review. Both explore the idea that social, cultural and leisure activities have a significant impact on population health over and above a range of very well known and powerful determinants such as education, employment, income, smoking and weight. Remarkably, both studies gathered data on whether participants in their surveys were involved in choral singing, but both failed to find any evidence of a link between singing and the measures of health employed.

Both surveys were examined very closely and were found to have methodological and reporting weaknesses. As a result, the evidence reported

cannot provide a credible test of the hypothesis underpinning this review. For the Bygren et al., study, the quality of information on the extent and nature of participants' involvement in choral singing is very weak, and the health outcome employed is extremely challenging i.e. whether a participant survived or died in the course of the study. It is highly implausible that any relationships would be found, especially following statistical controls for a wide range of highly influential factors. The Hyypä and Mäki study too was judged to have substantial weaknesses – not least that the proportions of choral singers in the sample were so low that even simple order relationships between involvement in singing and the self-assessed measure of health could not be demonstrated.

There is no question that in principle findings from large scale population surveys could be relevant to the hypothesis that group singing is beneficial for wellbeing and health. Nevertheless, the scale of the studies required, the care needed in gathering appropriately detailed and sensitive data, and most importantly, the current lack of a convincing case for expecting substantial effects, render it very unlikely that specifically designed studies would ever be mounted.

Theoretical perspectives on singing, wellbeing and health

In the studies under review a number of theoretical perspectives and principles developed outside the specific field of singing and health are drawn upon to understand how singing could have benefits for wellbeing and health.

Bailey and Davidson (2002, 2005) for example, make a convincing case for the relevance of Csikszentmihalyi's (2002) 'flow theory' in understanding the mechanisms through which singing can be beneficial to health. Singing can be a demanding activity which requires considerable concentration and practice, and so is capable of creating a sense of 'absorption' or 'flow' allowing the singer to escape from other preoccupations. Bailey and Davidson also highlight the arguments put forward by Csikszentmihalyi on the importance of social interaction for mental wellbeing, and link this to the inherently social character of group singing.

Cohen et al. (2006) also draw upon general theoretical principles developed in the field of Gerontology, in attempting to explain why creative activities, including singing in groups, have potential wellbeing and health benefits for older people. The key processes they suggest are that creative activity helps to generate a 'sense of control' and provides opportunities for 'social engagement'. Interestingly, they also add a further factor of motivation which they see as generated by the intrinsic aesthetic qualities associated with creative activity.

Conclusions and Recommendations

In all human cultures and throughout history, music has played a significant role in human life. Given the fact that group singing can be a powerful and moving experience, and given the possibility that singing could contribute to quality of life, wellbeing and even health – it is remarkable that so little research has explored these issues, and disappointing that the research which has been undertaken is so limited and so variable in character.



A number of studies stand out as making important contributions to what is clearly a field of research in an early stage of development:

- Bailey and Davidson (2002, 2005) show powerfully that amateur group singing can have benefits for participants across a wide social spectrum – from homeless men singing together, to middle class singers in traditional choral societies
- Clift and Hancox (2001) explore in more detail the range of benefits experienced by choral singers, and have identified empirically a number of key dimensions of benefit which can be measured

- Beck et al. (2000, 2006), Grape et al. (2002) and Kreutz et al. (2004) explore the possible physiological mechanisms which could underpin subjective experiences in both individual and choral singing
- Silber (2005) analyses the specific contributions which musical structures and processes can make in processes of developing social and personal wellbeing in a challenging group of women prisoners
- Louhivouri et al. (2005) link research on choral singing to the wider issue of 'social capital' and have explored experiences and benefits of group singing in very contrasting cultural contexts
- Cohen et al. (2006, 2007) report an ambitious quasi-experimental study of the possible effects of community singing on the mental and physical health of older people

At this stage, if work on the potential value of group singing for wellbeing and health is to develop, there is a need to create a collaborative and progressive programme embracing conceptual clarification / theory building and empirical research.

Conceptual clarification is needed with respect to the nature of singing itself, the various forms it can take, and the essential structures and processes involved (physically, physiologically and psychologically) in the production of the 'speaking voice' and the 'singing voice.'

Conceptual clarification is also needed with respect to the nature of wellbeing and health. The World Health Organisation has sponsored a large-scale international collaborative programme of work on health-related quality of life, which has elaborated and operationalised the WHO definition of health as 'a complete state of physical, mental and social wellbeing, and not merely an absence of illness or infirmity' (WHO, 1946). Conceptual and theoretical developments in the field of 'wellbeing' have seen a remarkable growth in recent years and the edited volume by Huppert, Baylis and Keverne (2005) represents a landmark text in this energetic area of work. Further work on singing, wellbeing and

health needs to take note of these recent conceptual and theoretical developments.

Specific theoretical work is required to link the nature, process and experiences of 'singing' with the nature, processes and experiences of wellbeing and health. The key questions that need to be addressed are 'What?' and 'How?' What effects, if any, does active involvement in group singing have on wellbeing and health? And how does singing have these effects – what mechanisms are at work? What mechanisms, for example, link the physicality of singing with the physical wellbeing of the body? What mechanisms link the psychological and social processes at work during singing with our sense of emotional wellbeing and mental health? Crucial to the theoretical task is to identify clearly those mechanisms which are distinctively and uniquely at work in the process of singing – and those which are contingent and may be brought into play equally well by a range of other social or creative activities.

Conceptual and theoretical work should go hand in hand with a systematic programme of empirical research. Research can help to inform theory development up to a point, but a truly progressive research programme requires the elaboration of a realistic theoretical framework which can generate hypotheses. A progressive programme also requires a critical mass of researchers and research teams working in collaboration and competition in testing hypotheses and establishing robust research findings through well-designed studies, replication and synthesis of evidence. As yet the

field is a long way from establishing even the foundation for such a progressive programme, but without it, future research is destined to be haphazard, unconnected and non-cumulative.

It is hoped that this review will contribute to a process of developing the progressive research programme needed to take this area of work forward.



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