Development of the Australian Ageing Semantic Differential AASD), a novel instrument for measurement of medical student attitudes towards older people

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Authorship Attribution Statement

As first and corresponding author for all published or submitted articles included in this thesis, I was responsible for the majority of the original research, as indicated below:

Chapter 2: Wilson MAG, Kurrle SE, Wilson I. Understanding Australian medical student attitudes towards older people. Australasian Journal on Ageing 2018; 37(2): 93-98.
I conceived the study and performed the critical review in this study. I was responsible for 60% of the work in drafting this manuscript.

Chapter 3: Wilson MAG, Kurrle S, Wilson I. Medical student attitudes towards older people: a critical review of quantitative measures. BMC Research Notes 2018; 11:71.
I conceived the study and performed the literature review in this study. I was responsible for 60% of the work in drafting this manuscript.

Chapter 4: Wilson M, Wilson I, Kurrle S. Development of the Australian ageing semantic differential, a new instrument for the measurement of medical student attitudes. Australasian Journal on Ageing 2018; 37(Supplement S2): 92.
I conceived this study and coordinated recruitment and data collection. I was responsible for most of the data analysis, and 60% of the work in drafting this manuscript.

Chapter 5: Wilson MAG, Tran Y, Wilson I, Kurrle S. Development of the Australian Ageing Semantic Differential, a new instrument for measuring Australian medical student attitudes towards older people. Australasian Journal on Ageing 2019; 00:1-8.
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I conceived this study and coordinated recruitment and data collection. I was responsible for a significant amount of the data analysis, and 50% of the work in drafting this manuscript.

Chapter 6: Wilson MAG, Tran Y, Wilson I, Kurrle S. Towards Ending Ageism in Medicine: A Confirmatory Study of the Australian Ageing Semantic Differential. Manuscript submitted to BMJ Open (8th December 2019). I was responsible for 50% of the work in planning, conduct and write up of the study.

Abstract

Attitudes of Australian medical students towards older people are important, as they can influence clinical practice. Initially I aimed to measure student attitude change after curriculum innovation. Literature review of Australian medical student attitudes revealed a gap for a valid, contemporary measure, inspiring the AASD. Review of international measures of student attitude identified semantic differential as the preferred instrument-type.

A qualitative study of 151 medical students at the Universities of Wollongong (UOW) and Sydney (USYD) produced opposite word pairs for the AASD. The AASD was piloted at the University of New South Wales (UNSW), (n=140, response rate 77%). Removal of a redundant item pair resulted in a 19-item instrument (Cronbach's α = 0.84).

An AASD survey of New South Wales (NSW) medical students (n=321, response rate 72.6%) at UNSW, USYD, and UOW revealed: 1) A four-factor solution on exploratory factor analysis (Instrumentality (I), Personal Appeal (PA), Experience (E) and Sociability (S)), 2) No sequencing bias, 3) Cronbach's α = 0.86, and 4) A positive mean AASD score (73.2/114), positive mean scores for three factors (PA, E and S) and negative mean I score. Female students had a significantly higher mean E score.

Confirmatory factor analysis (CFA) demonstrated adequacy of fit for AASD survey data from outside NSW to our four-factor model. Melbourne University, University of Western Australia and University of Adelaide students (n=188, response rate 79%) had a mean AASD score (72.8/114) comparable to NSW data.

The AASD is a reliable and generalisable instrument for measurement of Australian medical student attitudes towards older people, with face and structural validity. Deeper knowledge, within four factors of attitude, may be obtained from future medical education research employing the AASD.

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It has also been of tremendous benefit to have the assistance of Dr Yvonne Tran, who has been of valuable assistance with her biostatistical knowledge, especially important during the data analysis stages of my research.

I would also like to thank Dr Alastair Lethbridge, Assessment Officer at the University of Wollongong, who cheerfully helped me with the original formatting of the AASD survey instrument.

Declaration-Statement of Originality

This thesis describes original research conceived and conducted by myself, Mark Wilson, in the Faculty of Health and Medicine at The University of Sydney. In all of the publications incorporated within the thesis, I have been the first author. Therefore, I have been responsible for the largest share of the work contained in these published manuscripts. My co-authors are acknowledged appropriately in each published or submitted article, according to the convention of principle and corresponding author listed first, supervisor last, and other authors then listed in order of greatest contribution to least. All co-authors have given their permission for the published articles to be included in this doctoral thesis. To the best of my knowledge, there is no material contained in this thesis which has been previously published or written by another person except where due reference or acknowledgement is made in the thesis itself. This thesis, in its entirety or in parts, has not been submitted or contributed towards the award of any other degree at The University of Sydney, or submitted to any other institution of tertiary education for any purpose.

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Chapter 1: Introduction
1.1 Personal motivation for studying attitudes towards older people

From the earliest part of my life I remember reading in books and hearing during conversations such phrases as 'she is wise beyond her years' and 'he has an old head on his shoulders'. These aphorisms I always understood to be compliments, being raised to respect older family, friends and community members with whom I came into contact with. From my perspective, the right to be considered wise and 'old' was earned by the older people within my social network. It never ceases to amaze me how much can be learnt from everyday conversations with older people, absorbing their wisdom and benefitting from their experience. Many cultures, including the indigenous cultures of Australia, venerate elders as the repository of living history. Although I may not be of a culture anywhere near that ancient, I believe that we are all custodians of the unique micro-culture we are born into, learning all we can from our ancestors which may contribute to genuine social progress within our sphere of influence. Our flesh, blood and neurones are built on the DNA that we inherit, coming together as one living organism which implements a particular sequence of thoughts and actions that etch the distinctive mark that we make on the world. As we ourselves grow older, it is our responsibility to curate the knowledge we have gained, constituting a database of inestimable value to the generations which follow us.

My values regarding older people have also been greatly influenced by the career decision I made at a young age to study medicine, and later in pursuing the vocation of rural general practitioner. From the earliest stages of my training in rural general practice, I have been

fortunate to have had mentors and role models who have demonstrated genuine compassion and deep respect for their older patients. The lessons of continuity of care throughout the lifespan, especially during the later years, were learnt during numerous occasions where I was responsible for providing primary health care for older people, either at the surgery, in hospital, in their homes or in residential aged care.

Another driving motivation for advocacy to optimise attitudes of medical students towards more equitable and personalised medical care for older people has been my involvement in medical education. For almost 25 years I have taught medical students in the primary health care setting. I believe primary care is the best context for future doctors to be given a comprehensive view of how the health care needs of all members of our community, including older people, may be addressed. It is a delight to supervise medical students as they grow in their confidence and ability to develop holistic, evidence-based management advice for older patients. It is equally satisfying to regularly witness examples of cross-generational empathy during clinical interactions between medical students and older people.

Last, but by no means least, I would like to declare a deep and abiding interest in the welfare of older people in residential aged care. Since 2010 I have been a board member of a not-for-profit aged care company in my local community. I consider this responsibility to be an honour and my duty to contribute to the care of vulnerable older members of the community, something I feel an affinity to with my experience and particular skill set. This responsibility carries with it the need to work with colleagues in board and management to find innovative and sustainable solutions to the existential challenges of this industry in the

small corner of contemporary Australia in which I reside. One of the greatest challenges is to sustain the engagement of an adequate critical mass of doctors willing and able to provide primary health care for older people in residential facilities.

1.2 Why are medical student attitudes towards older people important to understand?

The attitudes of Australian medical students towards older people are important to understand in detail, a goal which will be aided by means of a contemporary, reliable and valid instrument of measurement. After graduation, doctors' attitudes will be an important driver of the quality and quantity of medical care provided for older people in society [1,2]. Medical students undergo a socialisation process during their training, where they adopt a range of attitudes, including those held towards older people [3]. Role modelling by medical practitioners, either by communication style or behaviour, will influence the way future generations of medical students and other health professionals learn to treat older people [4]. Quality and safety must always be paramount in medicine, founded on a core portfolio of knowledge and skills learnt at medical school, which continue to evolve with life-long professional learning. Whilst difficult to quantify the degree to which graduate attitudes will translate into medical practitioner behaviours [5], attitudes formed by the end of medical school will shape the unique paradigm within which each doctor will work to provide health care services for their older patients.

Nurturing positive attitudes towards older people, a group discriminated against in society, should be a fundamental learning outcome in the study of medicine. The Royal Australasian College of Physicians advocates for improving attitudes toward ageing by all practitioners

working in the Australian health care system [6]. Negative attitudes of health care staff in hospitals towards older people must be addressed, as they are recognised as a significant cause for low standards of care provision to patients [7]. In this post-modern era of consumer directed care, this does not mean doctors adopt an acquiescent approach to older patients, rather that they seek to provide evidence-based care using effective and empathic communication skills [8]. The cornerstones of medical professionalism are outlined in the Medical Board of Australia's code of conduct [9], which include patient-centred care and shared-decision making, vital ingredients required for optimal and personalised health care delivery. These principles of good medical care are foundational for all interactions with older patients, and need to be inculcated into the mindset of nascent medical professionals from the earliest stages of their medical education.

Fostering positive attitudes in medical students and graduates towards older people can influence future medical practice and career choices [10]. At the last Australian census, almost 3.7 million people were aged 65 years or over, representing 16% of the population [11]. Australians over 65 visit their GP and specialists at a greater rate than the younger population [12]. Adequate medical workforce numbers, particularly in general practice and geriatric medicine, are required to meet the increasing health care needs of an ageing population. The growing trend for Australian GPs to choose not to take on care of older people in residential settings [13,14] is therefore of serious concern.

It is important that Australian medical schools have a reliable measure by which to quantify their senior students' attitudes, to guide and evaluate curriculum innovations aimed at the

promotion of positive attitudes. Such an evaluative instrument for attitudes, especially if sufficiently sophisticated for measurement within several domains, may also provide insights into the origins of, and possible solutions to, the challenging problem of ageism extant in the modern Australian medical system.

1.3 Definitions – Ageism, Attitudes, Ageist Stereotypes. Links between attitudes and behaviours.

"Ageism is the stereotyping, prejudice, and discrimination against people on the basis of their age" [15, P1]. An attitude is a settled way of thinking about someone (or something) [16]. Ageist attitudes are revealed in the way a person expresses or applies their beliefs and values through their words or behaviour. A stereotype is a widely held but fixed and oversimplified image or idea of a particular type of person [16]. For example, one of the most commonly described ageist stereotypes in the literature is the so-called "high-warmth, low-competence" [1, P985] stereotype, a mixture of positive and negative perceptions of older people. Indirectly, as occurs for many such ageist stereotypes, treating older people as both warm (compliant or agreeable) and incompetent can only contribute to undermining their status in society.

Attitudes towards older people develop throughout life, as individuals perceive older people as attitude objects, and consciously or unconsciously respond explicitly or implicitly [17]. Attitudes towards older people, including ageist thinking, may be learnt through these experiences, and are shaped by socialisation. Once formed and consolidated, these ageist attitudes, like any other type of attitudes, are not easily changed.

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To borrow an insightful line from a sports coach and author;

"Ability is what you're capable of doing. Motivation determines what you do. Attitude determines how well you do it" [18].

As depicted in Figure 1 on the next page, there is a clear nexus between our attitudes and the behaviours we exhibit. However, this link may be modulated by a variety of factors which are essential to try to understand in the context of how attitudes influence workplace behaviours of clinicians towards older patients. What is known as the medical practitioner's 'intrinsic motivation' [19] is going to influence his or her attitudes, and ultimately the doctor's behaviours which follow. "These motivational and other self-regulatory factors that govern the manner and level of personal engagement in prescribed activities are simply taken for granted in cognitive science" [20, p5]. Factors such as professionalism, peer pressure and convenience may all influence the psychological phenomenon known as the 'intention-behaviour' gap. The meaning of this gap is that the relationship between attitudes and behaviours is nuanced, with moral norms producing a moderating effect on whether people actually carry out their intentions [21].

Figure 1.1 : Personal beliefs, values, attitudes and behaviour [22]
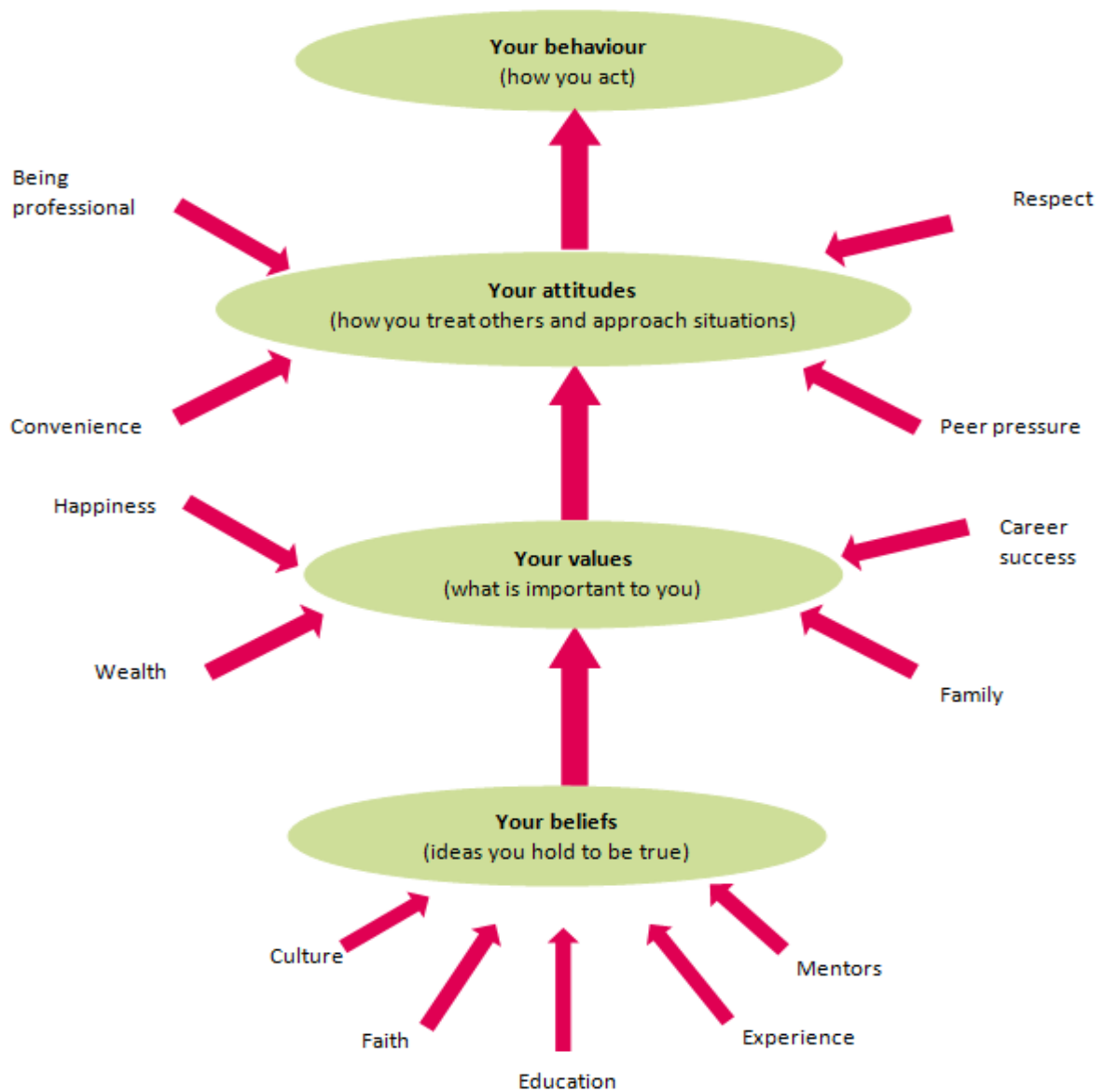
1.4 Some examples of ageism in medicine

Age discrimination is ubiquitous in society, and cross-cultural [23]. Unsurprisingly, ageism is thus also present in the medical community. There are many examples of ageism from the literature: Older people have been shown to receive less information from doctors during consultations when compared with younger patients [24, 25]. Sexism can compound age discrimination even further, when older women's health concerns are treated dismissively [26]. Ageism is sometimes evident systemically, for example when fewer treatment options are offered to older people in the general community with the same medical condition as those who are younger [27]. There is international evidence that doctors may even limit the number of older patients whom they treat in the community, with older patients considered more complicated and difficult to treat [28].

Of particular importance at this time in Australia's history, the ongoing Royal Commission into Quality and Safety in Aged Care is shining an intensely focused light on the failings within the contemporary aged care sector in this country, both in residential and community-based settings. A notable example of ageist behaviour raised in the preliminary report of the Commission, one of three priority areas highlighted as requiring urgent attention, is the need to reduce the overuse of physical and chemical restraints in residential aged care [29].

Leadership and advocacy for evidence-based, person-centred care for older people is an important role for the Australian medical profession to play. Australian medical students are taught to be community leaders, and to be engaged in improving the health of their community. The entire medical community, including students, must strive with

policymakers to develop an effective plan to counter subtle and insidious systemic ageism, and to eliminate the overt and dehumanising examples of ageism, such as the widespread use of chemical restraint within residential aged care. Most importantly, we as medical professionals must accept our individual and collective responsibility to do everything in our power to sustain and improve the equitable and personalised care for our older patients.

1.5 What practical benefits can be obtained by addressing ageism in medicine?

Ultimately, our moral imperative is for older people to receive fair and equitable access to health care. There are numerous potential public health and individual patient benefits which may be derived from medical professionals having more positive attitudes towards older people. For instance, more thoughtful and collaborative commencement and review of medications by doctors working in residential aged care is likely to improve the quality of care for residents living in this setting. A recent Australian study has identified the significant under-utilisation of medications for secondary prevention of cardiovascular disease for people living in aged care facilities and overuse of medications with known associations with falls risk [30].

Shared decision-making during consultations with patients has been reported to reduce the use of inappropriate tests and to reduce overtreatment [31]. With regard to older patients, who are more likely to have comorbidities, there are likely to be both cost and health outcome benefits from practitioner attitudes that welcome patient input into their own care. It is apposite that medical students receive education about the potential benefits to be gained for older patients from shared decision making during clinical consultations.

Older patient satisfaction and well-being are likely to improve in an environment where personalisation of care is created via excellent communication between doctor and patient. A medical practitioner attitude which is positive towards open and equitable consultation with older patients is vitally important to quality of care. Numerous studies have described a clear link between quality of communication occurring within individual patient-practitioner interactions and health outcomes [32, 33, 34].

For older people, end of life care is a challenging topic which needs to be broached with their medical practitioners. Sensitive instigation of conversations about end of life planning with older patients and their families, with use of an open and power sharing attitude in making difficult decisions, is an important aspect of the medical practitioner's work. Advanced care planning, grounded in a positive regard towards the autonomy of the older person, has been shown to reassure substitute decision makers that they are respecting the dying person's wishes, to greatly reduce hospitalisation rates, and to increase referrals of the terminally ill for palliative care [35].

1.6 How do medical student attitudes towards older people evolve during medical school?

A longitudinal US study has demonstrated the development of more negative attitudes towards older people in medical students as they progress through medical school [36]. There is evidence that the socialisation of medical students can lead to a reduction in empathy [37]. There are several reasons why the attitudes of medical students towards older people may worsen during medical school:

A) It is well known that younger people are in general more ageist towards older people, partly due to a fear of their own mortality and partly due to what is known as the 'social identity theory', where younger people value people of their own age more highly [23].

B) As much of medicine is learnt from clinical rotations in hospitals, recurrent exposure to the frail aged in the tertiary health care setting is likely to engender a skewed perspective of the ageing process in medical students. From this narrow experience, many students are likely to view older people as being sicker and lacking competency in many activities of daily life [38], when paradoxically the majority of older Australians consider themselves to be in good to excellent health [39].

C) The hidden curriculum, based on role modelling by medical practitioner mentors and teachers for medical students, has the potential to be a powerful force in the development of professional attitudes and behaviours [4].

1.7 How is geriatric medicine currently taught at Australian medical schools, and how are attitudes of medical students evaluated?

Geriatric medicine is currently taught to a number of core learning outcomes, aimed at producing medical graduates with the necessary knowledge, skills and behaviour required to competently provide holistic health care services for older people. Acknowledging that attitudes will influence behaviour, medical educators need to provide a geriatric medicine curriculum for medical students which is conducive both in content and context to facilitate development of positive attitudes towards older people. Typically, medical students learn most of their geriatric medicine in hospital rotations, often in general rotations which contain

an element of learning about the health care of older people. Eleven of nineteen Australian medical schools have mandatory rotations in geriatric medicine, six of which are between one week and three weeks in duration [40]. The rotations provide a blend of exposure to predominantly tertiary aged care, with some community aged care. Medical schools also provide opportunities for learning in primary care, which once again are quite variable in duration and the scope of their learning objectives, and may or may not provide opportunity to learn during home visits to older patients, at community health centres, or in residential aged care.

Attitudes towards older people are not as easily evaluated as the other domains within geriatric medicine, because they are a complex and multi-faceted construct. There is also a recognised divergence between explicit and implicit health practitioner attitudes [41]. Measurement of medical student attitudes by explicit questionnaire-based instruments is inherently difficult, as responses may be self-modulated by an individual to fit societal stereotypes [42]. An example of this phenomenon is found from a study of empathy of medical students in OSCE examinations, which raised the possibility that students may exhibit empathy when they believe that this is a domain in which they will be assessed [43].

1.8 What is the value in measuring attitudes of medical students towards older people?
Rather than the individual assessment of medical student attitudes, monitoring and evaluation of each medical school's geriatric medicine program is likely to be a more practically important context for use of a validated and reliable instrument for measuring these attitudes.

This theme will be discussed further through my thesis. Measurement of the mean attitude score of each graduate cohort [44], or at the completion of mandated geriatric rotations [45], have variously been investigated in the past, utilising existing quantitative instruments. This thesis advocates for a modern instrument of measure, the AASD, with potential to provide deeper, multi-factorial insights into our knowledge of developing Australian medical student attitudes towards older people.

Australian geriatric medicine specialists have long advocated for increased content hours for student learning about health care of older people in the crowded medical course curricula. It has been argued that the integrated teaching of geriatrics "…will help counter negative student attitudes and increase the prestige and desirability of dealing with older patients and reinforce to students that the elderly require special consideration no matter what specialty they choose for their careers" (46, p228). There is some evidence from the literature that medical student interest in geriatric medicine increases in relation to the positivity of student attitudes toward older people (47).

A number of interventional studies have been conducted internationally to investigate the effect of undergraduate geriatric curriculum innovation on medical student attitudes. Without reliable means of quantifying attitudes, it would be difficult to determine outcomes of geriatric medical education innovation at medical schools aimed at optimisation of attitudes. One published review of educational interventions has found that 10 of 19 studies resulted in a significant improvement in attitudes, whilst other study findings were mixed (48). Most importantly, interventions with a component of empathy building appeared to be the most

successful in achieving improvement in attitudes (49). Utilising senior mentors in medical education is a promising method for fostering empathy and positive attitudes in medical students. A good description of the effect from introducing a 'mentors-on-aging' component into a geriatric curriculum is very well described in the following study findings: "They saw older people as more personally acceptable, productive, progressive, and independent and less unattractive, ineffective, old-fashioned, and dependent than previously" (50, pS8)) The idea of introducing exposure to more healthy older people in the community as an important component of undergraduate medical education will be touched on again in Chapter 6 and in the Discussion section of this thesis.

A pertinent question must be to ask; what is the sustainability of any measurable improvements in medical student attitudes towards older people post – intervention? A New Zealand study demonstrated that attitudes of medical students after early exposure to older people in the community during their second year of training remained significantly better at fourth year, as compared with students who had not taken a more immersive and vertically integrated geriatric undergraduate program [51]. Longitudinal sustainability of positive attitudes towards older people in medical students and graduates will be a valuable area for future investigation, examining how attitudes translate into clinical practice.

1.9 The step-wise approach in development of the Australian Ageing Semantic Differential (See Figure 2 on P 20)

This thesis will describe the development of a new instrument for measurement of Australian medical student attitudes towards older people. The steps taken in development

of a reliable and valid instrument for the quantification of Australian medical student attitudes, the Australian Ageing Semantic Differential (AASD), will be outlined. Each of the next four chapters is constituted by a scientific paper published in a peer reviewed journal [52,53,54,55], with Chapter 6 a manuscript that has been submitted for publication.

Chapter 2 is a review of the literature on what is currently known about the attitudes of Australian medical students towards older people. On reviewing the literature regarding Australian medical student attitudes, it is apparent that knowledge is limited within this important domain, with most of the published research conducted in the past eight years. Qualitative studies have demonstrated mixed student attitudes towards learning in an environment devoted to the care of older people, with positives such as valuing short term placements in residential aged care facilities for critical reflection, improved decision making and inter-professional learning, and negatives such as considering aged care to be a less useful learning environment than in acute care. Positively, the students in this study had a significant increase in their enjoyment of working with older people [56]. Other research has shown that students may perceive communication challenges with older people, and describe negative themes such as nihilism, paternalism, high morbidity and low quality of life [57]. Australian attitude studies utilising quantitative methodology have directly applied or adapted one of two instruments developed in the United States of America, the UCLA-GAS or the ASD, neither having been robustly validated for use in Australia. The findings from these studies have indicated neutral to positive baseline student attitudes, with measurable improvement after curriculum intervention [45,58,59,60].

The next step taken in our work was to critically review the international literature in relation to instruments which have been used to quantify medical student attitudes towards older people. This review forms the substance of Chapter 3 of the thesis, and identifies the most appropriate instrument or instrument type considered to have the greatest potential for quantifying the attitudes of Australian students. In short, none of the existing instruments which have historically been used in attitudinal studies internationally were found to be well suited for the purpose of measuring Australian medical student attitudes towards older people. Due to a number of advantages as outlined in Chapter 3, the general structure of semantic differential, such as is used within the Aging Semantic Differential, was identified as the preferred type on which to base a novel and contemporary instrument.

Having identified the preferred instrument type, semantic differential, generation of a list of adjectives was required as a foundational step in development of the new instrument. One of the key attractions to utilising a semantic differential was the capacity provided by such an instrument to utilise words derived directly from the contemporary vocabularies of Australian medical students. A qualitative study was used to obtain words from third year medical students studying at two New South Wales (NSW) medical schools, the University of Sydney (USYD) and the University of Wollongong (UOW). Using these words, a number of polar opposite pairs of adjectives were derived, forming 'anchors' for scales within the new AASD instrument. The paper constituting Chapter 4 outlines the development of the AASD up to pilot stage [54]. In the pilot study, a survey was conducted of third year medical students at

the University of New South Wales (UNSW) Medical School. The pilot study showed the AASD to be usable and internally reliable, and also resulted in the removal of one redundant item pair from the 20- item prototype AASD, which subsequently evolved into the final 19- item pair instrument (See Figure 1 on Page 59 to view the AASD survey instrument).

Chapter 5 describes in detail the developmental study for the AASD in three NSW medical schools (the University of Sydney (USYD), University of New South Wales (UNSW), and the University of Wollongong (UOW)), where students in two separate years of the medical course (USYD first and third year, UNSW third year only, UOW first and third year) were surveyed. A very important step along the pathway of development for a semantic differential instrument such as the AASD is to test for response bias due to contextual contamination [61], the potential for bias inherent in the actual sequencing structure of the survey form. This component of research was pivotal in providing additional evidence for the internal reliability and face validity of the AASD, particularly before the instrument could be tested more broadly in a study involving medical students from other states of Australia. Another vital aspect of the NSW development study was to determine a factor structure for the novel AASD instrument. A four-factor model was found to be the preferred construct for the study data, demonstrating four domains of attitude: "Instrumentality", "Personal Appeal", "Experience", and "Sociability" [55].

Further testing for reliability and generalisability of the instrument across other states of Australia was performed by way of cross- sectional survey of medical students attending three institutions in states of Australia outside of NSW (South Australia, Victoria and

Western Australia), and is discussed in Chapter 6. This study was designed to provide robust evidence for the factor structure of the AASD, utilising confirmatory factor analysis (CFA). A paper from this study has been submitted for publication. This study has provided data that, on analysis, demonstrated no significant difference in mean AASD attitudes scores of students grouped by medical school across the country. As a result of this study, one final small evolutionary change in the four- factor model for attitudes was made, with the item pair "interesting- boring" found to be more appropriately placed within the Experience (E) factor than the Personal Appeal (PA) factor. Congeneric one-factor CFA was utilised in our analysis to demonstrate that data obtained from students outside of NSW had acceptable indices of fit within the four- factor model for the AASD.

The studies described in Chapters 4, 5 and 6 provide robust evidence for the face and structural validity, internal reliability and generalisability of the AASD instrument for measuring attitudes of Australian medical students towards older people. Other salient results from our research conducted primarily for the purpose of development of the AASD instrument will be described In the Discussion in Chapter 7. Finally, the Discussion will also raise the potential utility of the AASD for future Australian medical education research.

1.10 Aims of Thesis

Aim 1: To review current knowledge of the attitudes of Australian medical students towards older people (Chapter 2).

Aim 2: To critically review the instruments which have most commonly been used to quantify the attitudes of medical students towards older people (Chapter 3).

Aim 3: To describe the development, from first principles, of a contemporary instrument with which to quantify the attitudes of Australian medical students towards older people (Chapters 4,5,6).

Aim 4: To demonstrate evidence for the usability, reliability and generalisability within Australia of the newly developed instrument, the AASD, for measurement of medical student attitudes towards older people. To this end, AASD survey data was obtained from a sample of students attending six university medical schools in four states of Australia, in three different years of study (Chapters 4,5,6).

Aim 5: Description of the method by which the AASD was developed, using original qualitative study of Australian medical student written language to source words for the survey instrument anchors, providing evidence for face validity of the instrument (Chapters 4 and 5).

Aim 6: To identity and confirm the factor structure of the AASD, demonstrating evidence for its structural validity (Chapters 5 and 6).

Figure 1.2 : Diagrammatic representation of the step-wise development of the

Australian Ageing Semantic Differential.

Step-wise Development of the Australian Ageing Semantic Differential

Chapter 2

Understanding Australian Medical Student Attitudes Towards Older People:

A literature review of current knowledge of Australian medical student attitudes.

Chapter 3

Medical Student Attitudes Towards Older People. A Critical Review of Quantitative Measures:

Review and critique of measures of medical student attitude used in international research.

Chapter 4

Development of the Australian Ageing Semantic Differential (AASD), a New Instrument for the Measurement of Medical Student Attitudes :

Early development of the AASD, with semantic differential scales constructed from words obtained by qualitative study of University of Sydney and University of Wollongong medical students. Pilot study data demonstrated usability and internal reliability of the AASD at University of NSW.

Chapter 5

Development of the Australian Ageing Semantic Differential (AASD), a New Instrument for measuring Australian Medical Student Attitudes Towards Older People :

Establishes a factor structure and tests for sequencing bias. The AASD was found to be internally reliable and generalisable across three NSW medical schools - University of NSW, University of Sydney, and University of Wollongong, in two different years of the courses.

Chapter 6

A Cross-sectional Study of Australian Medical Student Attitudes Towards Older People Confirms a 4-Factor Structure and Psychometric Properties of the Australian Ageing Semantic Differential (AASD):

Shows evidence for reliability, generalisability and structural validity of the AASD outside NSW. Confirmation of the AASD factor structure using data from medical student surveys at Melbourne University, University of Adelaide and University of Western Australia.

Four factor model of Australian medical student attitude -

Instrumentality

Personal Appeal

Experience

Sociability

Australian medical student attitudes toward older people were generally positive, except in the domain of Instrumentality.

Older students were more likely to rate Instrumentality of older people more highly.

Female students were more likely to rate Experience of older people more highly.

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Chapter 2: Review Article - Understanding Australian medical student attitudes towards older people.

Introduction

In this journal article, we sought to examine current knowledge of Australian medical student attitudes towards older people from what has been described in the published and peer reviewed literature. A perceived gap in understanding of Australian student attitude was considered to be worth trying to fill, as this would be of value to medical educators with an interest in and/or responsibility for continuous improvement of undergraduate curricula in geriatric medicine. There is evidence from the international literature that ageist attitudes are present in the health care sector, including previous study findings of negative attitudes in medical students. Quantitative, qualitative and mixed methodology studies of Australian medical student attitudes were identified by this literature review. As the number of studies published was quite small, only seven in total, the salient findings from these studies were summarised within the review article.

Review Article
Understanding Australian medical student attitudes towards older people

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Objective: *The aim of this article was to review the literature around Australian medical student attitudes towards older people.*

Methods: *An Ovid cross-search and SCOPUS search were performed using keywords such as 'Attitude', 'Medical Student' and 'Aged or Older or Elderly'.*

Results: *Several recent studies have investigated the attitudes of Australian medical students towards older people. Baseline attitudes at two medical schools were positive. Three studies quantified attitude improvement after curriculum intervention. All the studies used US-developed instruments, which have not been validated in Australia. Qualitative studies have described mixed attitudes towards older people: negative themes included nihilism, paternalism, communication issues, greater morbidity and reduced quality of life. Positively, students placed value on clinical decision-making and critical reflection during residential aged care placements.*

Conclusion: *Australian medical students' attitudes towards older people are mixed and not well understood based on quantitative measures developed for use in the US and on qualitative evidence. Future research in this area requires a reliable and locally-validated instrument.*

Policy Impact: A thorough investigation of medical student attitudes, quantified by a validated instrument and complemented by qualitative research, should facilitate curriculum innovation in geriatric medicine to improve graduate outcomes.

Practice Impact: Effective research into medical student attitudes towards older Australians requires a locally developed and validated instrument of measurement.

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Introduction

This article reviews what is known about the attitudes of Australian medical students towards older people. Little would appear to have been published regarding these attitudes in Australia. A recent editorial in this journal discussed Butler's constructs of ageism [1]. Butler, a US physician, in 1969 used this term to describe prejudice by the younger generation towards those in the community who are older [2]. Ageism and ageist language are ubiquitous throughout modern society, including in the health-care sector [3]. The international literature indicates that health professionals, including medical students and early career doctors, may have more negative attitudes towards older people compared with the general population [4,5]. There is also some evidence that medical student attitudes towards older patients become less positive throughout the course [6,7]. This is thought in part to be due to the socialisation process that occurs during medical training, where medical students come to consider older people with chronic illnesses as normative [8].

One of the most important constructs of ageism is the attitudes of health professionals. Of the eight *Australasian Journal of Ageing* articles on health professional attitudes recently identified by the editors, not even one examined medical student attitudes [1]. This constitutes a significant knowledge gap for Australian educators and clinicians involved in undergraduate geriatric medical education. Understanding medical student attitudes towards older people is vital, to overcome ageism and to provide older Australians with optimal and sustainable medical care.

Why are medical student attitudes important to understand?

There is an imperative for medical course outcomes to include the adoption of positive attitudes towards older people. Nurturing an empathic approach in future medical practitioners towards those who are discriminated against in society, including older people, is fundamental for appropriate and equitable health-care provision. It is also a timely reminder to medical students that the majority of older people today are healthy and more educated than their predecessors of previous generations [9]. Facilitating the development of positive attitudes in medical students and medical graduates towards older people has been shown to influence future clinical practice and career

choices [3]. Therefore, quality interactions depend on medical graduates' attitudes towards older persons [7].

From a practical workforce and service delivery point of view, future Australian medical graduates will increasingly be providing medical care for older people. It is projected that by 2050, there will be almost two billion people aged over 60 years of age worldwide and almost 400 million over 80 [10]. Of the Australian population, almost 3.7 million people (16%) are aged 65 years or over [11]. Medicare Australia statistics show that people over 65 make more than twice the number of general practitioner visits and four times the number of specialist visits annually than those under 65 years of age [12].

There are many different ways that ageist stereotypes may affect health-care provision to older people by medical practitioners. For example, some general practitioners limit the number of older people whom they will take on as new patients, especially in aged care facilities [13]. A 2009 report to the Australian Capital Territory (ACT) Health Department on sustainable primary health care indicated that the highest priority for the ACT was to provide primary care to the residents of aged care facilities. However, interviews with community members and aged care facility staff indicated a serious shortage of general practitioners willing to accept the care of older ACT residents entering residential aged care facilities [13]. Older patients are often considered more difficult to treat, which may partly explain reluctance by some doctors to take on their care [14].

Ageist role modelling by experienced clinicians is likely to have an influence on medical student attitudes. The literature indicates that less medical information is sometimes provided by doctors to older patients, especially to older women [15]. Also, older people are offered less aggressive treatments, for example for common cardiac conditions, when compared with younger patients [16]. Such negative role modelling, part of the so-called hidden curriculum, is known to have a powerful effect on the development of professionalism in medical students [17].

Methods

An Ovid cross-search to examine medical student attitudes towards older people was performed on 18 March 2016, in addition to a separate SCOPUS search performed with the same search terms. An Ovid cross-search was repeated on 5 May 2017 to screen for any more recently published Australian studies in the area of medical student attitudes. The search was performed using the following keywords: 'attitudes', 'medical student', 'aged or older or elderly'. The principle author conducted the search. There was no limit on years searched, as studies of medical student attitudes toward older people have been conducted internationally for almost 50 years, predominantly in the US. Only articles

in English were included. There were no country restrictions. The inclusion criteria was any article from a peer reviewed journal investigating Australian medical student attitudes. As only a small number of studies were identified, individual studies were critiqued in relation to potential response bias and in terms of the quantitative instruments utilised. Studies were excluded if only health professional students other than medical students or medical graduate attitudes were investigated. Whilst the key articles reviewed were from peer reviewed journals, a small number of relevant Australian federal and territorial government online reports were also cited.

Results

Literature review of Australian medical student attitudes towards older people (see Figure 1)

A total of seven studies were identified from the literature to explore the Australian medical student attitudes towards older people. These studies were all published in the past six years. Student attitudes were investigated either as a component of research aimed more broadly at the development of educational resources in geriatric medicine or as an evaluation of interprofessional learning (IPL) in aged care.

Quantifying medical student attitudes towards older people

What would appear to have been the first study in Australia to quantify medical student attitudes towards older people was performed in 2008, investigating student and teacher preferences for education on dementia in Western Australia [18]. There was a 14% response rate, 208 from the target group of all 1320 medical students across the state. The two medical schools surveyed were at the University of Western Australia, which had a six-year undergraduate medical program, with a dedicated four-week geriatric medicine rotation in fourth year, and at the University of Notre Dame (Australia), which had a four-year graduate medicine program without a specific geriatric medicine rotation. Encouragingly, student attitudes were found to be positive in four of the 14 items of the University of California Los Angeles Geriatrics Attitudes Scale (UCLA-GAS). Caution must be exercised when interpreting the findings as there was a low response rate and as the instrument used to assess the attitudes, the UCLA-GAS, was not validated for use with Australian medical students. The UCLA-GAS instrument may be viewed in Appendix S1 (Supporting information).

A subsequent University of Western Australian study utilised a multidisciplinary health student survey in 2009, which included 129 third- to fifth-year medical students [19]. The study had an excellent response rate of 76%. Across all students, responses to the UCLA-GAS scale were neutral to moderately positive. Whilst higher scores by health faculty teachers in the first four of the 14

Figure 1: Search strategy for literature review.
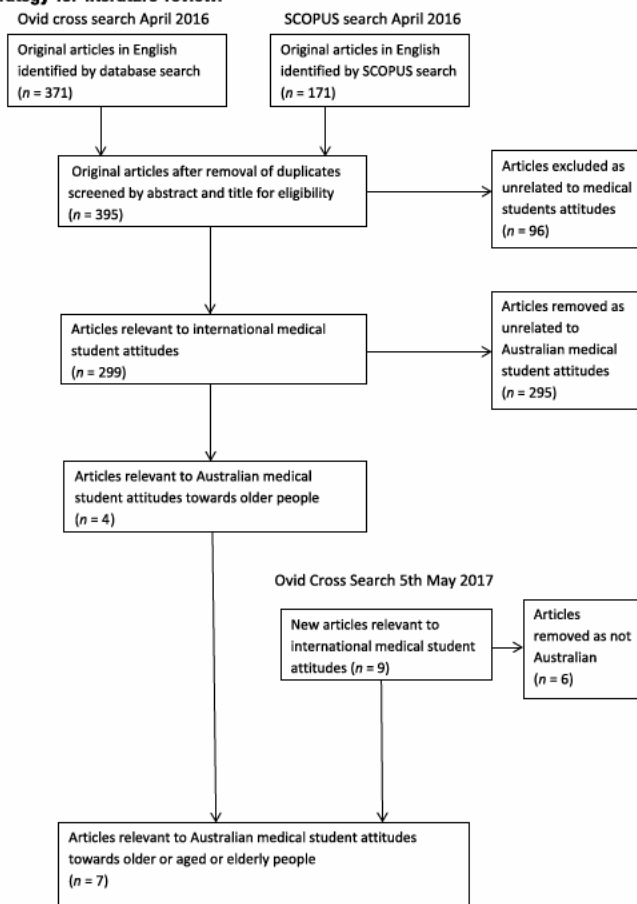
UCLA-GAS items provided some evidence for content validity, the authors felt more work was required to validate the scale.

An evaluation of the effect of increasing the length of an undergraduate geriatric medicine course from 2.5 to 4.5 weeks, constituting a blend of 18 hours of tutorials with clinical exposure, on fifth-year South Australian medical students' attitudes and self-perceived competency scores was published in 2014 [20]. In the first Australian 'before and after' curriculum intervention study designed to measure medical student attitudes, the UCLA-GAS scale was employed. The authors acknowledge that the UCLA-GAS has not been validated for use in Australia. Of the 65 eligible fifth-year medical students, 60 completed pre- and post-course surveys. The study found a positive mean attitude item score at commencement, with significant improvement in the mean attitude item score postintervention, from 3.34 to 3.66 ($P < 0.001$). Whilst the finding that senior Australian medical student attitudes were positive at baseline is encouraging, the validity of the attitude improvement measured is unknown.

A very recently published study of Australian medical student attitudes investigated student perceptions of IPL in an aged care facility placement of between two- and 13-weeks duration [21]. In this study, 51 students studying in three West Australian tertiary institutions across seven health professions, including medicine, had pre- and postplacement measurement of their attitudes towards older people, using the Ageing Semantic Differential (ASD). There was a significant increase in positive attitudes towards older

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people after these placements. Students were also found to have had significantly improved teamwork and a more positive professional identity. These findings, whilst interesting, are based on a small number of students in training for seven different health professions, including medicine. Also, the ASD attitude instrument was developed in the United States almost 50 years ago [22] and has never been validated for use in Australia. The ASD instrument can be seen in Appendix S2 (Supporting information).

Qualitative and mixed method studies of Australian medical student attitudes to older people

A Tasmanian group published the findings from their study into the experiences of fifth-year undergraduate medical students completing five-day clinical placements at two Australian residential aged care facilities during 2013 and 2014, supported by a structured program [23]. The data included surveys of knowledge on dementia and questions about the attitudes to work with older people. Students' knowledge on dementia was high initially and improved significantly by the end of the placement. Preplacement, fewer than 20% of students looked forward to their aged care placement, and only one-third expected to enjoy the experience. Whilst a formal instrument for measuring attitudes was not used, the authors report 'Across the five-day program, there was a statistically significant 37% improvement in medical students' expected and actual enjoyment of working with older people from the beginning to the end of the clinical placement week' [23; p.4]. Qualitative data obtained from recordings of medical student focus group discussions were examined for themes, which were both positive and negative. Some students were challenged by communicating with cognitively impaired patients. Learning in the context of aged care was considered by some students as less useful than hospital rotations at the latter stage of their course. Encouragingly, some students thought that aged care placements stimulated problem-solving and critical reflection and reinforced training and clinical decision-making.

Another recent mixed method study considered the effect of an innovative anticipatory reflective learning strategy in geriatric medicine curriculum, facilitated for 128 second-year University of Western Australian medical students [24]. In this study, students were shown photographs, offered older adult narratives and made to engage in collaborative dialogue to foster the reflection on their interactions with older patients. The students' reflective pieces during the early phase of the intervention indicated that many felt older people have a significantly reduced quality of life and high levels of morbidity. A number of students felt powerless to treat or cure older patients, some wrote paternal or patronising reflections, and many struggled with communication issues. Notably, the study captured a positive shift in student attitudes towards older people after the reflective learning sessions, as measured by statistically significant improvement in

eight of the 13 items of a locally adapted UCLA-GAS instrument, and by qualitative feedback. The authors conclude that 'The findings demonstrate the importance of facilitating learning opportunities for preflection as they create a safe space for students to begin the developmental process of becoming aware of potential bias, to explore and unpack their thoughts around ageing and integrate this growing awareness into their future clinical experiences and practise with older adults in more mindful ways' [24; p.7,8].

A study of interprofessional team-based learning from Victoria demonstrated high levels of satisfaction for residential aged care facility (RACF) residents, health professional students and educators [25]. In this small study of 10 fourth-year medical student volunteers, and 16 nursing, occupational therapy and pharmacy student volunteers, teams including one medical student were recruited and asked to identify the primary health issues, by reviewing the RACF medical records and by interviewing residents. Using an adapted version of the Dundee Ready Education Environment Measure mean student ratings indicated positive perceptions of the educational experience. Unfortunately, there was no subset analysis looking specifically at the medical students' experience to indicate whether their mean ratings were positive. A potential weakness in this study, apart from the very small sample, was that the recruits were all volunteers. This is likely to have created a bias in favour of students interested in learning in an aged care setting.

Discussion

What is known about the attitudes of Australian medical students towards older people has been described within the past six years, and on balance engenders cautious optimism. Encouragingly, baseline medical student attitudes were found to range from neutral to positive [18–20]. Also, attitudes were more positive after a curriculum intervention [20,21,24]. However, our current understanding of the attitudes of Australian medical students towards older people is incomplete and potentially flawed, as it is based on two quantitative instruments developed for use in the United States [22,26], without adequate local validation studies, and on qualitative evidence.

Investigators in three of the four purely quantitative studies performed to date have chosen to use the UCLA-GAS instrument to measure student attitudes. Another mixed method study used a locally adapted version of the UCLA-GAS, removing one item and modernising the language of other items within the scale. Some authors challenge the construct validity of the UCLA-GAS, which utilises student responses to a series of positive and negative statements about older people, potentially measuring beliefs rather than attitudes [27]. Simply assuming the validity of the UCLA-GAS or an adapted version in the Australian

context is far from ideal, especially as some US researchers have questioned the validity and reliability of the instrument in their own setting [8].

Whilst there has been some evidence for internal reliability from two West Australian studies [18,19], other evidence for validity of the UCLA-GAS in an Australian setting is limited. Whilst a lower proportion of students responded positively to four of the 14 items in the UCLA-GAS as compared with their teachers, questions remain over the content validity for the UCLA-GAS in an Australian context. Item two of the scale, concerning resource allocation, probably has different meaning in Australia, with a universally subsidised health-care system. Also, in view of significant differences in funding for retirement and health care between US and Australian society, the attitudinal meaning from student responses to item 12 would likely mean different things in each country. An attempt was made to modify the UCLA-GAS in the more recent West Australian study [24], indicating a perceived need to adapt the instrument for Australian data collection. This further clouds the utility of the UCLA-GAS in Australia, as repeatability and generalisability of any instrument are a necessary requirement to demonstrate its validity.

A recent study, again from Western Australia, measured the effect of aged care facility placements on health professional student attitudes towards older people with the ASD instrument [21]. The authors admit that the validity of using the ASD in their study is unknown. Internationally, the ASD has been widely used to quantify medical student attitudes to older people [5,28]. The ASD directs respondents to indicate which of thirty-two polar opposite adjectives best describes their attitudes to an older person. There are advantages and disadvantages using the ASD in the context of Australian medical education. A major advantage of the semantic differential construct is that it is less likely to confound attitudes with an individual student's beliefs [27], as compared with more explicit attitudes scales such as the UCLA-GAS. Also, instruments that rely on responses to explicit statements are open to criticism because of the social undesirability of the respondent indicating ageist views in their responses [29]. As more subtle attitudinal direction and domains are captured by a semantic differential, false-positive attitudes are less likely to be measured by the ASD. Disadvantages of using the ASD to quantify Australian medical student attitudes include the absence of any formal validation in this context and that it was developed in the United States in 1969 [22], using language from that time and place.

The available qualitative Australian data regarding medical student attitudes to older people are mixed. Whilst Annear et al. [23] found that the majority of a group of fifth-year Tasmanian medical students did not look forward to short placements in RACF, indicating negative attitude, there was

a measurable improvement in their enjoyment of working with older people postplacement. Whilst some of the students viewed education in an aged care setting as an opportunity cost, a number of students felt that short-term RACF placement helped them to critically reflect and make better clinical decisions. Whilst the study on a second-year West Australian medical student cohort found the initial attitudes on the UCLA-GAS to be positive, towards older people, this was contrasted by qualitative data that identified themes including a sense of nihilism, paternalism, perceptions of high morbidity and low quality of life [24]. Communication challenges with older people were described as a negative by students in both studies [23,24]. On a positive note, a small Victorian IPL study has indicated that volunteer students, including medical students, on average rated their educational experience in a RACF as positive [25].

Conclusion

Further research into Australian medical student attitudes towards older people will assist medical educators with curriculum innovation in geriatric medicine education. Development of a reliable and appropriately validated instrument to quantify medical student attitudes in the Australian setting needs to be an important aspect of this research. A more comprehensive understanding of medical student attitudes should help guide medical educators to address unexamined ageist aspects in the hidden curriculum, which may contribute to medical student professional development, with the goal of improving the quality and quantity of medical care provided to future generations of older Australians.

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Supporting information

Additional supporting information may be found in the online version of this article at the publisher's web-site:

Appendix S1. University of California, Los Angeles – Geriatrics Attitudes Scale (UCLA-GAS) [26].

Appendix S2. Aging semantic differential [22].

Appendix S1 – University of California Las Angeles - Geriatrics Attitudes Scale [26]

THE 14-ITEM GERIATRICS ATTITUDES SCALE

DIRECTIONS: Please use the scale to indicate the degree to which you agree or disagree with each statement. There are no right or wrong answers. The best response is the one that truly reflects your personal opinion. Findings of this study will be reported only on a group basis with no individual names identified. "Old people" and "elderly patients" mentioned in the questions refer to persons aged 65 or older.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. Most old people are pleasant to be with.	1	2	3	4	5
2. The federal government should reallocate money from Medicare to research on AIDS or pediatric diseases.	1	2	3	4	5
3. If I have the choice, I would rather see younger patients than elderly ones.	1	2	3	4	5
4. It is society's responsibility to provide care for its elderly persons.	1	2	3	4	5
5. Medical care for old people uses up too much human and material resources.	1	2	3	4	5
6. As people grow older, they become less organized and more confused.	1	2	3	4	5
7. Elderly patients tend to be more appreciative of the medical care I provide than are younger patients.	1	2	3	4	5
8. Taking a medical history from elderly patients is frequently an ordeal.	1	2	3	4	5
9. I tend to pay more attention and have more sympathy towards my elderly patients than my younger patients.	1	2	3	4	5
10. Old people in general do not contribute much to society.	1	2	3	4	5
11. Treatment of chronically ill old patients is hopeless.	1	2	3	4	5

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
12. Old persons don't contribute their fair share towards paying for their health care.	1	2	3	4	5
13. In general, old people act too slow for modern society.	1	2	3	4	5
14. It is interesting listening to old people's accounts of their past experiences.	1	2	3	4	5

Appendix S2 – The Aging Semantic Differential [22]

themselves and younger persons quite differently on the attitudinal dimensions. In this sense, the SD approaches relevance for use in measures of self-conception as well as respondent conception of others.

Further, as recommended by Osgood (1957), the SD could be used as a projective technique in some research designs. Thus, the scales could be prefaced with a statement such as "What does a young man think of a 70-year-old man?" Such a study should be instrumental in contrasting the respondent's conception of himself with his, perhaps conflicting, perception of his image in the eyes of others.

THE AGING SEMANTIC DIFFERENTIAL

Below are listed a series of polar adjectives accompanied by a scale. You are asked to place a check mark along the scale at a point which in your judgment best describes the social object indicated. Make each item a separate and independent judgment. Do not worry or puzzle over individual items. Do not try to remember how you have marked earlier items even though they may seem to have been similar. It is your first impression or immediate feeling about each item that is wanted.

SOCIAL OBJECT: ....

(I-I)	Progressive	........:	........:	........:	........:	........:	........:	........: Old-fashioned
(A-D)	Consistent	........:	........:	........:	........:	........:	........:	........: Inconsistent
(A-D)	Independent	........:	........:	........:	........:	........:	........:	........: Dependent
(A-D)	Rich	........:	........:	........:	........:	........:	........:	........: Poor
(PA-U)	Generous	........:	........:	........:	........:	........:	........:	........: Selfish
(I-I)	Productive	........:	........:	........:	........:	........:	........:	........: Unproductive
(I-I)	Busy	........:	........:	........:	........:	........:	........:	........: Idle
(A-D)	Secure	........:	........:	........:	........:	........:	........:	........: Insecure
(I-I)	Strong	........:	........:	........:	........:	........:	........:	........: Weak
(I-I)	Healthy	........:	........:	........:	........:	........:	........:	........: Unhealthy
(I-I)	Active	........:	........:	........:	........:	........:	........:	........: Passive
(PA-U)	Handsome	........:	........:	........:	........:	........:	........:	........: Ugly
(PA-U)	Cooperative	........:	........:	........:	........:	........:	........:	........: Uncooperative
(PA-U)	Optimistic	........:	........:	........:	........:	........:	........:	........: Pessimistic
(A-D)	Satisfied	........:	........:	........:	........:	........:	........:	........: Dissatisfied
(I-I)	Expectant	........:	........:	........:	........:	........:	........:	........: Resigned
(PA-U)	Flexible	........:	........:	........:	........:	........:	........:	........: Inflexible
(PA-U)	Hopeful	........:	........:	........:	........:	........:	........:	........: Dejected
(A-D)	Organized	........:	........:	........:	........:	........:	........:	........: Disorganized
(PA-U)	Happy	........:	........:	........:	........:	........:	........:	........: Sad
(PA-U)	Friendly	........:	........:	........:	........:	........:	........:	........: Unfriendly
(PA-U)	Neat	........:	........:	........:	........:	........:	........:	........: Untidy
(PA-U)	Trustful	........:	........:	........:	........:	........:	........:	........: Suspicious
(A-D)	Self-Reliant	........:	........:	........:	........:	........:	........:	........: Dependent
(I-I)	Liberal	........:	........:	........:	........:	........:	........:	........: Conservative
(A-D)	Certain	........:	........:	........:	........:	........:	........:	........: Uncertain
(PA-U)	Tolerant	........:	........:	........:	........:	........:	........:	........: Intolerant
(PA-U)	Pleasant	........:	........:	........:	........:	........:	........:	........: Unpleasant
(PA-U)	Ordinary	........:	........:	........:	........:	........:	........:	........: Eccentric
(I-I)	Aggressive	........:	........:	........:	........:	........:	........:	........: Defensive
(PA-U)	Exciting	........:	........:	........:	........:	........:	........:	........: Dull
(A-D)	Decisive	........:	........:	........:	........:	........:	........:	........: Indecisive

The dimension containing each scale is indicated parenthetically by the following notations:

    Instrument—Ineffective Dimension = (I-I)

    Autonomous—Dependent Dimension = (A-D)

    Personal Acceptability—Unacceptability Dimension = (PA-U)

Each of the 32 scales was scored from 1 to 7. For example:

    Progressive 1 :   2 :   3 :   4 :   5 :   6 :   7 : Old-fashioned

Factor scores were obtained by adding the score values of adjectives contained in each dimension.

Conclusion

Attitudes of Australian medical students towards older people were found to be neutral to positive in the small number of quantitative studies conducted to date. These findings are clouded by the fact that the quantitative measures employed have been US designed, and not robustly validated for use in the Australian context. Qualitative findings from the Australian studies which investigated student attitudes were mixed, with some students perceiving that their ability to critically reflect and make clinical decisions improved from working with older people in residential aged care, while others felt that learning in this context was an opportunity cost, and inferior to working in more acute hospital rotations. Another study revealed negative themes in student attitudes toward older people, including nihilism, paternalism, high morbidity and low quality of life.

This literature review has led to the conclusion that more research is needed in the area of Australian medical student attitudes towards older people. It was concluded that a reliable and appropriately validated, up-to-date instrument was required for the measurement of attitudes in Australian medical students. The aim of such an instrument would be to provide a more comprehensive understanding of these attitudes. In time, research utilising a validated instrument to measure attitudes of medical students could potentially be of value in the development and evaluation of innovations in undergraduate geriatric medical curricula. Arguably, an important aim of curriculum innovation should be to reduce the likelihood for students to develop negative attitudes towards older members of the community. As will be outlined in the next chapter, many international studies have used a range of quantitative measures with which to measure the effect of geriatric curricula on medical student attitudes.

Chapter 3: Medical student attitudes towards older people: a critical review of quantitative measures

Introduction

Over the past fifty years, a plethora of instruments have been used in international research studies for the measurement of the attitudes of medical students towards older people. The aim of this critical review of the quantitative measures used to investigate medical student attitudes towards older people was to examine the pros and cons of each of the most commonly used instruments in medical education studies reported in the literature. After critiquing the instruments used historically to measure attitudes, the purpose of this review was to make a persuasive case for selection of the most appropriate type of instrument to be chosen for future research with Australian medical students.

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CrossMark

Medical student attitudes towards older people: a critical review of quantitative measures

Mark A. G. Wilson[1*], Susan Kurrle[2] and Ian Wilson[3]

Abstract

Objectives: Further research into medical student attitudes towards older people is important, and requires accurate and detailed evaluative methodology. The two objectives for this paper are: (1) From the literature, to critically review instruments of measure for medical student attitudes towards older people, and (2) To recommend the most appropriate quantitative instrument for future research into medical student attitudes towards older people.

Results: A SCOPUS and Ovid cross search was performed using the keywords Attitude and medical student and aged or older or elderly. This search was supplemented by manual searching, guided by citations in articles identified by the initial literature search, using the SCOPUS and PubMed databases. International studies quantifying medical student attitudes have demonstrated neutral to positive attitudes towards older people, using various instruments. The most commonly used instruments are the Ageing Semantic Differential (ASD) and the University of California Los Angeles Geriatric Attitudes Scale, with several other measures occasionally used. All instruments used to date have inherent weaknesses. A reliable and valid instrument with which to quantify modern medical student attitudes towards older people has not yet been developed. Adaptation of the ASD for contemporary usage is recommended.

Keywords: Instrument, Quantify, Medical student, Attitudes, Aged persons

Introduction

Medical student attitudes towards older people in the community are important to understand and quantify. Ageist attitudes, ubiquitous in the healthcare sector, may influence medical practice [1]. There are many examples of ageism in the literature, including the reticence of some primary care physicians to take on the care of older people [2], provision of less information to older people by doctors [3], cardiologists offering a narrower range of options to older patients [4], and specialists offering less aggressive treatment to older women with breast cancer [5]. To ameliorate such ageism, fostering development of positive attitudes towards older people during medical training must be a fundamental outcome of medical curricula.

Fixed medical student views about older people have been studied for over 50 years. The first longitudinal study investigating attitudes recently provided evidence that student attitudes towards older people decline throughout medical school [6]. As attitudes are complex and multi-dimensional, both qualitative and quantitative research are required to provide more comprehensive understanding. One of the greatest challenges in understanding student attitudes has been the plethora of instruments used in their measurement, each with particular deficiencies. The aims of this paper are to critically review the instruments which have been utilised to quantify medical student attitudes, and to identify the optimal instrument type for future medical education research.

Main text
Method

On 18th March 2016, 171 articles were identified utilising the following keywords: Attitudes AND medical student AND older OR old OR elderly in the database SCOPUS,

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and by manual searching directed by article citations, using SCOPUS and PubMed. An additional 371 articles were found by an Ovid Cross Search using the same search parameters. During March and April 2016, from a total of 542 articles identified by the search, 299 were found to be relevant, after eliminating those not in English (29), duplicated (147), or found to be unrelated to the area of interest by screening title, abstract and text (76).

An additional Ovid Cross Search was performed using the same search terms on May 5 2017, identifying 9 new articles since the original search. A total of 308 peer-reviewed journal articles were thus reviewed to inform this paper (see Fig. 1).

Results

Three systematic reviews of health professional, including medical student, attitudes towards older adults were identified from the literature [7–9]. In addition to these studies, several other studies of medical student attitudes were identified by this review. Most research has quantified the effect of geriatric medical curriculum innovation on medical student attitudes, and has either shown neutral or positive effect. Some studies simply sought to describe the attitudes of a cohort of medical students. Thirty- one relevant studies, including instruments used to measure attitudes, are summarised in Table 1.

A description and comparison of the instruments used for measurement of medical student attitudes towards older people

The Ageing Semantic Differential (ASD)   The most widely used instrument in published studies of medical student attitudes towards older people has been the ASD. The construct of semantic differential was first adapted to study social stereotypes in 1946 [41], introducing the potential for this instrument type to test multiple dimensions of attitudes [42]. The ASD directs respondents to indicate which of thirty-two polar adjectives best describes their attitude to an older person across a seven step scale. The subject is asked to indicate the point on the scale which represents the direction and intensity of his or her judgement between each pair of polar opposite adjectives. Three major dimensions were identified by factor analysis: instrumental-ineffective, autonomous-dependent, and personal acceptability-unacceptability [43].

The semantic differential (SD) approach to quantifying medical student attitudes has several strengths: SD eliminates the problem of statements within instruments, which may capture beliefs rather than attitudes, a potential flaw of many instruments [44]. The ASD more specifically quantifies attitudes, whereas other instruments such as the Kogan Attitude Toward Old Persons Scale [45] or the Palmore scale [46] confound attitudes
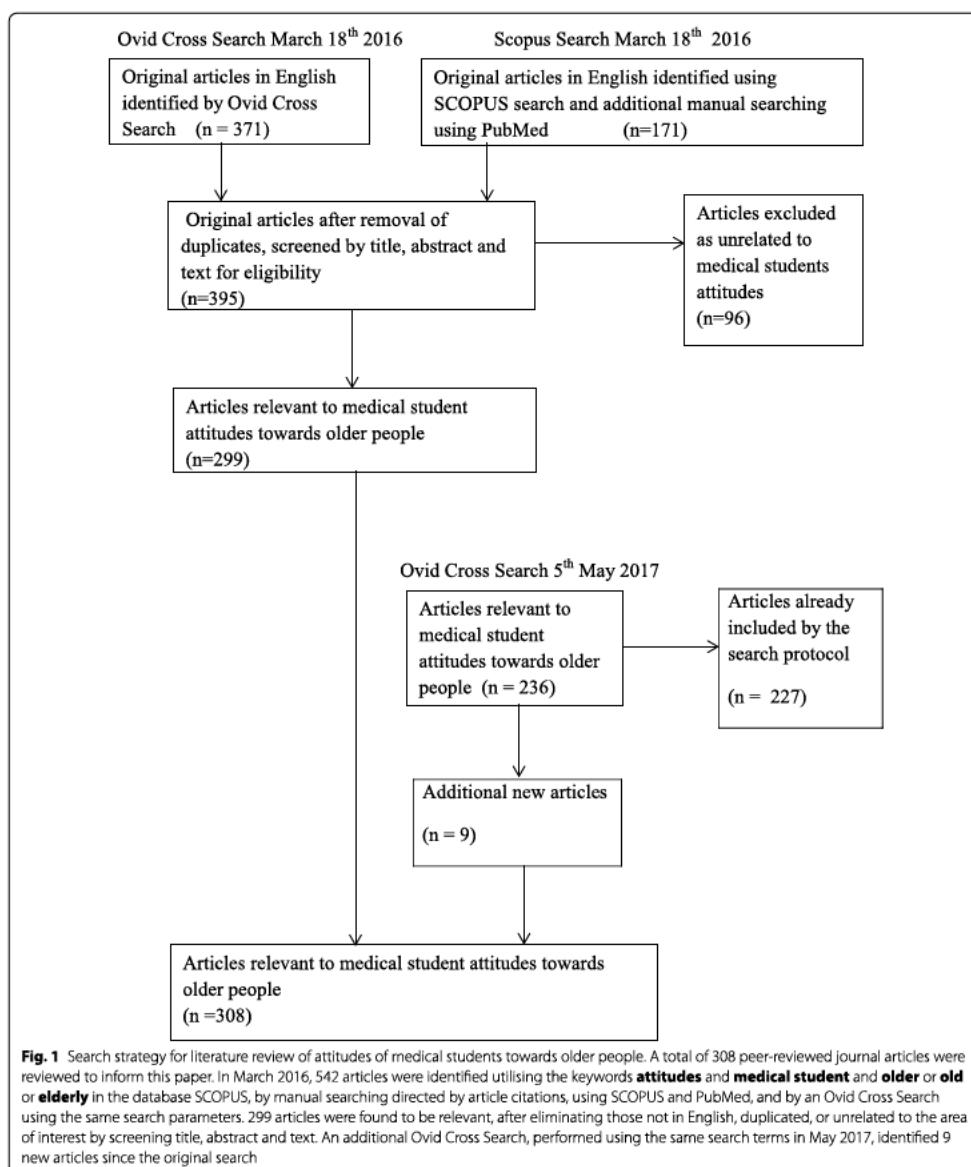
with knowledge. SD requires relatively short survey times for measuring complex concepts [47], and has reported superior reliability and validity over Likert-based or Stapel scales [48].

While the ASD is widely used, there are three main areas of potential weakness:

1. Many adjectives employed by the ASD are outdated, with polar adjectives derived from surveys done in the United States of America in the 1950s [43]. Selection criteria of words for the scale are unclear. The pilot study tested the instrument on non-medical undergraduates at the University of Missouri. Some argue that vague or unfamiliar adjectives may result in students choosing more neutral responses [33].
2. The original work did not evaluate young people's attitudes towards older women. The original factor analysis of the ASD asked respondents to use the ASD to evaluate three different age groups of men, the oldest attitudinal object group consisting of men 70 to 85 years of age [43]. Sexism has no place today in the accurate measurement of attitudes towards older people.
3. There is a question of whether the ASD has validity, and whether it measures what it was intended to measure. The factor structure of the original ASD has been debated [49, 50], with some favouring a four factor structure as a better fit to the data [44].

Polizzi's refined ageing semantic differential   The original ASD was refined in 2003, converting the instrument to 24 adjectival pairs using only one factor, the evaluative factor [50]. Polizzi's refined ASD has been criticised as a having poor fit using structural equation modelling [51]. A recent US study evaluating the validity of the refined ASD concluded that the refined ASD lacked validity, and was a unidimensional instrument. On the basis of qualitative data from this study, a four factor instrument was postulated, with experience the new factor [19].

The University of California Los Angeles Geriatric Attitude Scale (UCLA-GAS) and modified versions   Another widely used instrument to measure attitudes of medical students towards older people is the UCLA-GAS. The UCLA-GAS is a 14 item survey using Likert-scale responses indicating whether the respondent agrees or disagrees with the statement. Cronbach's alpha in the original work was 0.76, with good construct validity [52]. However, the UCLA-GAS makes use of five positive and nine negative statements about older patients, exposing the method to criticisms including the tool measures beliefs rather than attitudes [44], and is unbalanced or may have other problems with construct validity [53].

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Fig. 1 Search strategy for literature review of attitudes of medical students towards older people. A total of 308 peer-reviewed journal articles were reviewed to inform this paper. In March 2016, 542 articles were identified utilising the keywords **attitudes** and **medical student** and **older** or **old** or **elderly** in the database SCOPUS, by manual searching directed by article citations, using SCOPUS and PubMed, and by an Ovid Cross Search using the same search parameters. 299 articles were found to be relevant, after eliminating those not in English, duplicated, or unrelated to the area of interest by screening title, abstract and text. An additional Ovid Cross Search, performed using the same search terms in May 2017, identified 9 new articles since the original search

Some authors have expressed a view that the UCLA-GAS by its very structure may inadvertently support the messages of ageism [16]. Initially developed for medical residents in 1998 [52], the UCLA-GAS has been used to investigate medical student attitudes. In US studies, the internal reliability for the UCLA-GAS or modified version

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Table 1 Quantitative studies investigating medical student attitudes towards older people

Author	Study description	Quantitative measure of attitudes utilised	Study finding
Beer et al. (2011) [10]	Cross sectional survey of students from two medical schools (1 undergraduate and 1 postgraduate course) and geriatric medicine teachers: Response rate for students 14% (208/760). Australia	UCLA-GAS	Responses of students and teachers generally similar. Teachers had more positive responses to the first 4 items of the scale
Bernard et al. (2003) [11]	Non- randomised trial: 225 first and second year medical students. Intervention-healthy senior mentorship program over 2 years vs control group. USA	ASD	Attitudes improved in both cohorts, significantly more in the intervention group
Brand et al. (2016) [12]	Mixed methodology. Qualitative plus pre and post–test: 128 first year medical students. Intervention-curriculum innovation. Australia	Modified UCLA-GAS	Positive attitude change in 8 of 13 test items
Cheong et al. (2009) [13]	Cross sectional survey: 218 first year and 124 third year medical students. Singapore	Kogan's Attitude To Old Person Scale (KOAP)	Positive mean attitudes
Chua et al. (2008) [14]	Cross sectional survey: 250 first year medical students at admission. Singapore	Modified UCLA-GAS	Positive mean attitudes score
Diachun et al. (2010) [15]	Randomised controlled study: 196 (75% response rate) third year medical students recruited. Intervention-2 week geriatric rotation vs non-geriatric rotation. Canada	Modified UCLA-GAS	The attitudes of the intervention group did not deteriorate as much as the control group
Duke et al. (2009) [16]	Pre and post- test study: 71 first year medical students. Intervention-senior mentoring program. USA	Modified UCLA-GAS	Positive change in attitudes measured
Eskildsen & Flacker (2009) [17]	Pre and post-test study: 129 first year medical students. Intervention-short geriatric course. USA.	UCLA-GAS	Positive change in attitudes measured
Fields et al. (1992) [18]	Pre and post-test study: 127 fourth year medical students. Intervention-geriatrics rotation. USA	ASD	No measurable change in attitudes
Gonzales et al. (2010) [19]	Cross sectional validity study: 199 first year (91%) and second year (9%) medical students recruited voluntarily. USA	Polizzi's refined ASD	Validity of the instrument could not be confirmed by structural equation modelling
Hall et al. (1997) [20]	Controlled trial, pre and post-test: 162 (63% response rate) fourth year medical students recruited. Intervention short geriatric course. USA	Modified Maxwell- Sullivan Attitudes Scale (MSAS)	No measurable change in attitudes
Hughes et al. (2008) [21]	Cross sectional survey of students (first year), pre and post–test study(fourth year): 165 first years (99% response rate) and 70 (58% response rate) fourth year medical students. Intervention –geriatric short course in fourth year. UK	Modified UCLA-GAS	More positive attitudes in fourth year students compared with first year students. No measurable change in attitudes after the intervention

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Table 1 continued

Author	Study description	Quantitative measure of attitudes utilised	Study finding
Intrieri et al. (1993) [22]	Pre and post-test study with comparison group: 96 third year medical students. Psychiatry clinical rotation with gerontology (intervention) vs psychiatry alone (comparison group) USA	ASD	Positive change in attitudes
Koh et al. (2012) [23]	Pre and post-test, with control: Intervention group (261) second year students, holistic curriculum in geriatric medicine. Control group (254). Singapore	Modified UCLA-GAS	Positive change in attitudes
Lorraine et al. (1998) [24]	Pre and post-test study: 100 fourth year medical students. Intervention-Brief "ageing simulation" intervention. USA	ASD	Positive change in attitudes
Lu et al. (2010) [25]	Pre and post- test study with comparison group: 137 (71% response rate) first year medical students. Intervention-Healthy senior mentorship. USA	ASD	No change in attitudes
Muangpaisan, Intalapapron & Assantachai (2008) [26]	Cross sectional survey: 146 fourth year medical students (Response rate 61%) and 60 medical residents (Response rate 50%). Thailand	UCLA-GAS	Attitudes positive, no significant difference between students and graduates
Nagoshi et al. (2008) [27]	Cohort study with comparison group: 59 medical students surveyed at beginning and end of course. Intervention-new course curriculum. USA	UCLA-GAS	No difference in attitudes between groups
Pacala et al. (1995) [28]	Pre and post-test study with comparison group: 55 fourth year medical students. Intervention-ageing simulation workshop. USA	ASD, modified MSAS.	Positive change in attitudes.
Roscoe et al. (2005) [29]	Pre and post-test study: 252 third year medical students (89% response rate). Intervention-short geriatrics course. USA	Modified ASD	Positive change in attitudes
Sahin et al. (2012) [30]	Cross sectional survey: 106 health professional students, including 43 medical students, and 150 postgraduates. Turkey	Modified UCLA-GAS	Doctors had more positive attitudes than students.
Seaman et al. (2017) [31]	Pre and post- test study: 51 volunteer health professional students, including a small number of medical students. Intervention-Inter-professional team work in an aged care facility. Australia	ASD	Positive change in attitudes, but numbers too small for significance
Shue et al. (2005) [32]	Pre and post-test study with comparison group: 161 first year medical students. Intervention-senior mentorship program. USA	ASD, modified MSAS	Positive change in attitudes
Stewart et al. (2007) [33]	Non-randomised controlled trial: Four sequential cohorts of 249 medical students. Intervention-new geriatric curriculum across course. USA	ASD	Neutral attitudes, no measurable difference between cohort attitudes

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Table 1 continued

Author	Study description	Quantitative measure of attitudes utilised	Study finding
Tam et al. (2014) [34]	Pre and post-test study: 60 (82% response rate) fifth year medical students. Intervention-curriculum change. Australia	UCLA-GAS	Positive change in attitudes
Ten Haken et al. (1995) [35]	Pre and post-test longitudinal study: 117 (63% response rate) undergraduate medical students. Intervention-clinical skills course. USA	Modified ASD	No sustained change in attitudes
Varkey et al. (2006) [36]	Pre and post-test study: 84 first year medical students. Intervention-ageing game 'one off' intervention. USA	MSAS, ASD	Positive change in attitudes
Watson (2013) [37]	Cross sectional survey: 129 third to fifth year medical students. Australia	UCLA-GAS	Neutral to positive across scales
Wilkinson, Gower, Sainsbury (2002) [38]	Pre and post-test study with comparison group: 186 second year students had intervention. 62 of this cohort were followed up in fourth year, compared with 160 controls. Intervention-community contact in second year and 4 week attachment in 4th year. New Zealand	ASD	Positive change in attitudes measured in second year and fourth year
Wilson & Gamser (1982) [39]	Pre and post-test study: 61 first year medical students (Response rate 74%). Intervention-short geriatrics course. USA	ASD	Positive change in attitudes
Zwahlen et al. (2010) [40]	Pre and post-test study: 347 (Response rate 81%) undergraduate medical students across the medical course. Intervention-New course curriculum. USA	UCLA-GAS	No change in attitudes

ASD Ageing Semantic Differential, *UCLA-GAS* University of California Los Angeles Geriatric Attitude Scale, *KAOP* Kogan's Attitude to Old Person, *MSAS* Maxwell-Sullivan Attitudes Survey

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has been sub-optimal (Cronbach's alpha 0.69) in studies outside UCLA [53–55].

Despite concerns regarding the reliability and validity in measuring medical student attitudes in the US, the UCLA-GAS has been used internationally, often with modification. Three items were modified in the Singapore UCLA-GAS, with Cronbach's alpha 0.73 when administered to first year medical students [14], but alpha of 0.61 -0.69 in a subsequent Singapore study [23]. Turkish investigators studied medical student attitudes using a literally translated UCLA-GAS instrument. Cronbach's alpha was 0.67. An attempt was made to show validity by comparing student responses on a local unvalidated scale of elderly discrimination attitudes [30]. The authors of a study comparing attitudes of medical students and residents towards older people in Thailand used a modified UCLA-GAS, finding no significant difference between student and resident attitudes, not describing reliability [26]. One Australian study of fourth year medical students and their teachers provides evidence of internal reliability (Cronbach's alpha 0.78) for the UCLA-GAS and some evidence of content validity, with geriatric medicine teachers having more positive attitudes scores than their students [10].

The Maxwell-Sullivan Attitudes Survey (MSAS) Another instrument occasionally used to quantify attitudes towards older patients is the MSAS [56], developed for use with trainees in family medicine [52]. It is a 28 item survey within five scales, in part attitudinal, but also concerning educational preparedness to manage older patients. Significant concerns about the reliability and validity of the MSAS [33, 52] limit the scale's utility in medical student attitudes research.

Kogan's Attitude to Old Person Scale As indicated earlier, this scale confounds knowledge and beliefs with attitudes, and has seldom been used to measure medical student attitudes. There are flaws in the structure of this scale, making its psychometric utility questionable [51].

Other quantitative instruments for measuring medical student attitudes to older people

Fraboni's Scale on Ageism Fraboni's Scale on Ageism (FSA), developed from studies of Canadian high school and college students, and workers, consists of 29 statements which evaluate attitudes towards older people [57]. In studies of age bias in university students, the FSA has some evidence of reliability and validity [58]. The scale has scarcely been used to investigate medical professional attitudes. Used in one Australian study of hospital doctors' attitudes, results indicated neutral to positive mean

attitudes [59]. Validity and reliability of the scale for either medical graduate or student research is unknown.

Carolina opinions on care of older adults A more recently developed instrument, the Carolina Opinions on Care of Older Adults, was developed in view of questions in relation to the reliability and generalizability of other instruments [60]. While promising in a North Carolina context, there is no further published evidence of repeatability and reliability for this instrument.

Implicit association test Another interesting area of research with regard to student attitudes towards older people are implicit attitude measures. The Implicit Association Test involves a rapid sorting task between two contrasting categories, comparing response latencies to stimuli, for example adjectives or faces of younger versus older people [61]. Whilst not described in medical student research, a study of psychology students demonstrated positive explicit attitudes but neutral implicit attitudes toward older people [61]. The authors postulate that respondents may avoid a socially undesirable response to explicit attitudes instruments.

Discussion

Currently no reliable and well validated instrument is available for use in quantitative research into medical student attitudes towards older people. On reviewing the literature where instruments have been used to quantify medical student attitudes towards older people, the instrument type with the most positive attributes is semantic differential (SD). A SD has the potential to reliably measure complex attitudes in a short space of time [47], which is important when surveying busy medical students. A well- constructed SD instrument should be more specific in measurement of student attitudes than explicit instruments utilising statements that may confound student attitudes with beliefs and/or knowledge about older people [44, 51]. Respondents' evaluative responses are less likely to be inhibited by an SD as compared with more explicit instruments [61]. Within a semantic differential, several dimensions of medical student attitudes may be evaluated, potentially providing greater insights.

Although the ASD has been extensively used for research of medical student attitudes toward older people, important flaws in this tool require addressing. The adjectives in a refined ASD instrument should reflect contemporary language, the evaluation should be of an older male or female person, and the newly refined instrument should undergo appropriate tests for reliability and validity in the context where it is utilised. A

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previous attempt made by Polizzi to refine the ASD [50], has proven to be inadequate [19, 51].

Medical student attitudes towards older people must be accurately quantified and understood for medical educators to effectively develop curricula in geriatric medicine which foster positive attitudes to older people as a core graduate outcome. We suggest that a properly validated modified ASD instrument be developed, using contemporary language and designed to measure multiple dimensions of medical student attitudes towards older people. Future quantitative studies should be complemented by qualitative data to more fully inform educators in geriatric medicine.

Limitations

It is possible that a systematic review may have identified additional instruments or evidence to inform this critical review. Attitudes are complex, multi-dimensional and challenging to accurately quantify in medical education research.

Abbreviations
ASD: Ageing Semantic Differential; UCLA-GAS: University of California Los Angeles Geriatric Attitude Scale; KAOP: Kogan's Attitude to Old Person; SD: semantic differential; MSAS: Maxwell-Sullivan Attitudes Survey; FSA: Fraboni's Scale on Ageism.

Authors' contributions
MW conceived the study and conducted the literature review. MW contributed approximately 60% of the manuscript drafting, with approximately 20% input from SK and 20% input from IW. MW, SK, and IW jointly approved the final manuscript. All authors read and approved the final manuscript.

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Conclusion

This critical review has been a catalyst for my decision to develop a novel Australian instrument for quantifying the attitudes of medical students towards older people. For various reasons, each one of the existing instruments of measure for attitudes of medical students towards older people have been found wanting. The identification of a gap for Australian medical education researchers in not having access to a 'fit for purpose' quantitative instrument has been the prime motivator for me to work with colleagues to develop such an instrument.

The most promising instrument type for measurement of the attitudes of Australian medical students towards older people was considered to be semantic differential. One of the most commonly used instruments internationally, the existing Aging Semantic Differential (ASD) was considered to have a number of weaknesses, rendering it a poor choice for Australian medical education research into medical student attitudes. These flaws include the use of outdated words, derivation using sexist principles, and questions regarding validity. Notwithstanding the issues with the ASD, a number of features of semantic differential make this type of instrument attractive for the development of a novel instrument for use in Australia. These positive attributes include efficiency in measuring the complex construct of attitudes, less likelihood of response bias than with more explicit statement-based instruments, and the capacity to provide data within a number of dimensions/factors of attitudes.

We conclude that the development of a novel semantic differential instrument for use in Australian research into medical student attitudes towards older people should employ words derived from the current medical student population in this country, and be appropriately validated. Future educational research should ideally incorporate a qualitative component which will compliment quantitative investigation of medical student attitudes. We believe that an important aim of undergraduate curricula in geriatric medical should be to nurture positive attitudes towards older people. These attitudes require evaluation by a well validated quantitative instrument.

Chapter 4: Development of the Australian ageing sematic differential, a new instrument for the measurement of medical student attitude

Introduction

The published abstract text below accompanies our poster presentation (Figure 4.1 on Page 54), which summarises the early development of the Australian Ageing Semantic Differential (AASD). It describes the qualitative research conducted at The University of Sydney and the University of Wollongong to obtain words used for construction of opposite word pair scales for the new instrument, and findings from the pilot study of the AASD at the University of New South Wales. More detail on the development and methodology for this pilot study is provided in Chapter 5.

Abstract

Aims: To describe the development and pilot of the Australian Ageing Semantic Differential (AASD), a new instrument to measure Australian medical student attitudes towards older people.

Methods: Based on the literature, a semantic differential was selected as the preferred instrument to quantify Australian medical student attitudes. In early 2016, 318 different words describing older people were obtained from voluntary written reflections of 151 third year University of Sydney and University of Wollongong medical students. Using qualitative analysis (nVIVO), the most frequent words were selected. Five content experts agreed upon bipolar opposite word pairs for the instrument. The 20 item AASD, with scales 1 to 6, was piloted in paper form with third year University of New South Wales (UNSW) medical students. AASD scores range from 20 – 120, from least to most positive.

Results: The pilot survey of third year medical students across two campuses of UNSW had an excellent response rate of 77% (140 of 180). The mean AASD score was 74.9 (range 45 – 106), indicating positive attitudes. The AASD instrument had very good internal reliability (alpha 0.83), improving to 0.84 for the 19-item instrument on removing one item pair (Quiet-Talkative).

Conclusions: The 19 - item pair AASD shows promise in measuring attitudes of Australian medical students, based on pilot testing at one Australian medical school (UNSW). Very good internal reliability has been demonstrated (alpha 0.84). On average, third year students were found to have positive attitudes towards older people. The AASD requires further validation studies.

Conclusion

The 20-item prototype AASD, based on words obtained from qualitative study of Australian medical students, was found to be usable and to have good internal reliability (Cronbach's alpha 0.83) in a pilot study of 140 third year medical students at the University of New South Wales. The response rate for students in several large tutorial groups who were invited to participate in the study was very good (77%). The mean respondent attitudes score was 74.9/140, which indicates globally positive attitudes. The range of AASD scores was 45 – 106. On analysis of the data, it was found that Cronbach's alpha improved to 0.84 on removal of one item pair, 'quiet – talkative'. After reflection on the semantic ambiguity of this pair in describing polarity of attitude, a decision was made to remove this item pair from the AASD instrument. Testing of the AASD instrument's internal reliability demonstrated that Cronbach's alpha was reduced by removing any of the other nineteen item pairs. Therefore, the resultant AASD instrument has nineteen item pairs.

Figure 4.1 : Poster Presentation at The Australian & New Zealand Society for Geriatric Medicine Annual Scientific Meeting 2018
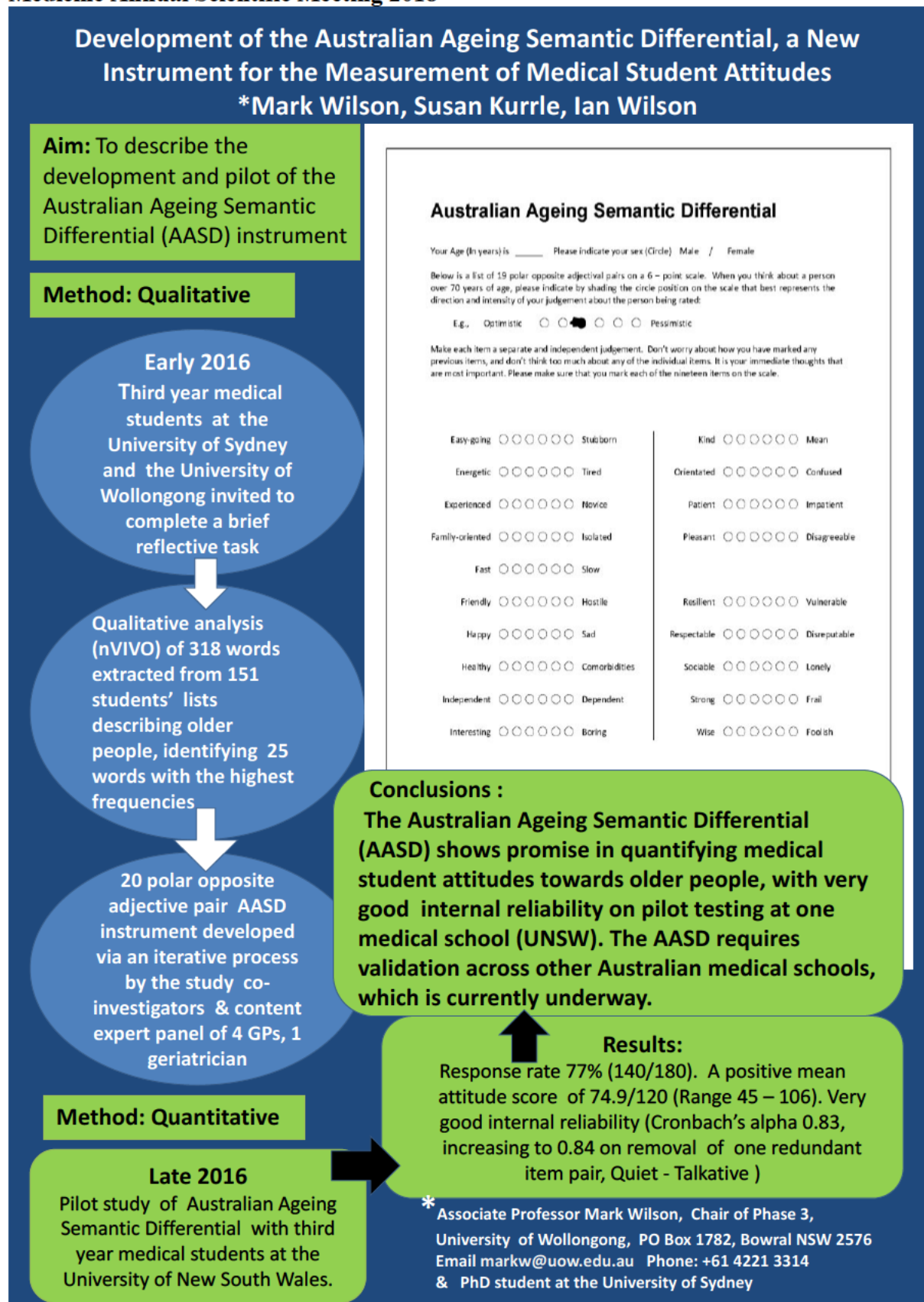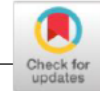
Chapter 5: Development of the Australian Ageing Semantic Differential, a new instrument for measuring Australian medical student attitudes towards older people

Introduction

This chapter will comprehensively describe the development of the Australian Ageing Semantic Differential (AASD) between 2015 and early 2018, by way of a series of studies of first and/or third year medical students attending three medical schools in the Australian state of New South Wales, the University of New South Wales (UNSW), The University of Sydney (USDY), and the University of Wollongong (UOW).

As already described in Chapter 4, a qualitative study of third year medical students at USYD and UOW was conducted in early 2016 to obtain the words required for construction of the AASD, in what we call the "item development" phase. Next, in late 2016, a pilot study of the prototype instrument was performed with third year medial students at UNSW. After removing one redundant item pair from the prototype instrument, the resultant AASD evolved into a nineteen-pair instrument. In late 2017 and early 2018, a much larger study of the AASD was then performed of first year and third year medical students at USYD and UOW, and third year students at UNSW. This study was designed to elucidate the factor structure for the AASD by Exploratory Factor Analysis, and to demonstrate further evidence for the usability, internal reliability, generalisability and validity of the instrument. An important component of this study was to test the AASD for sequencing bias, to ensure that the actual order of the survey form was not leading to response bias. This was done by randomly providing three variants of the AASD survey form to study participants, with the words in 'standard', reversed or inverted sequencing.

RESEARCH

WILEY   Australasian Journal on Ageing

Development of the Australian Ageing Semantic Differential, a new instrument for measuring Australian medical student attitudes towards older people

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Objective: This study outlines development of an instrument for measuring attitudes of medical students towards older people, the Australian Ageing Semantic Differential (AASD).

Methods: Words for AASD scales were derived from the reflections of 151 third year medical students attending two Australian medical schools. A pilot study of the AASD was then undertaken with third year students at another medical school to confirm usability and reliability of the instrument. After slight modification, a larger study using the AASD was then undertaken of medical students attending the three institutions, in order to obtain sufficient data for exploratory factor analysis.

Results: n = 321 (response rate 73%). Mean AASD score 73.2/114. Cronbach's $\alpha = 0.86$. There was no evidence of sequence bias. Exploratory factor analysis (EFA) demonstrated four factors: Instrumentality; Personal Appeal; Experience; and Sociability. A lower mean instrumentality subscore for all students and a higher mean experience subscore for female students were noted.

Conclusions: The AASD instrument proved internally reliable, and its use was generalisable to different groups of medical students. Its design ensured construct and face validity, and responses were not affected by sequencing bias. This study has revealed positive student attitudes towards older people. Variation in attitudes requires further investigation.

KEYWORDS
aged, attitude, Australia, medical students

1 | INTRODUCTION

This article outlines development of a new instrument for measurement of attitudes of Australian medical students towards older people. We previously reviewed the literature on what is known about these attitudes, identifying the need for a reliable and valid measure for use in Australian medical education.[1] Importantly, we know health professional attitudes may influence clinical practice negatively, with a number of examples from the international literature showing the effects of ageism on health-care delivery, including reluctance by some doctors to take on older patients' care,[2] provision of less information to older patients, especially older women,[3] and less aggressive treatment options offered for the same condition in an older patient compared with someone younger.[4] Australian university geriatric medicine curricula aim to produce graduates with a package of skills, knowledge and attitudes, preparing them to meet the health-care requirements of older people. This study focuses specifically on quantifying student attitudes. A deeper understanding of attitudes may guide innovation aimed at countering ageist influences in the hidden curriculum, where students learn from modelling their clinical teachers.[5]

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Quantitative evidence indicates most Australians do not perceive health professionals as ageist.[6] However, qualitative research of older Australians perceptions has revealed a sense of structural ageism in the health system: "Although they recognised such treatment as wrong, they felt it was, for the most part, unchallengeable and unchangeable" [7; p271]. A recent Australian study on health-care quality demonstrated an example of subtle, entrenched ageism, the under-prescribing of cardiovascular medications to aged care residents at high risk of cardiovascular disease.[8] Addressing health system prejudices towards older people requires explicitly identifying discriminatory attitudes and behaviours which may occur in our own or colleagues' practice,[9] in parallel with encouraging inclusive and positive student attitudes towards older people.

A critical review of international literature regarding medical student attitudes towards older people led to selection of a semantic differential as the optimal quantitative instrument type to develop for Australian use.[10] Widely employed internationally, the US-developed instrument with this construct, the Ageing Semantic Differential (ASD), has been in use since 1969.[11] It is our contention that the ASD is not fit for purpose in Australian contemporary medical education for several reasons:

1. Some ASD items are linguistically outdated, derived from US English language of more than 50 years ago,[12] with potential for either ambiguity in meaning and/or polarity, such as Liberal—Conservative and Ordinary—Eccentric.
2. Some items are likely to be redundant in the 32–item-pair instrument (eg Tolerant-Intolerant and Flexible-Inflexible have very similar meaning).
3. The ASD's factor structure has been criticised,[13] and the case has been made for a four- instead of three-factor model.[14]
4. Item selection for the original ASD was determined in a gender discriminatory manner, with students asked to evaluate only men of different ages.[11]
5. The ASD instrument has not been well validated for use in Australia.[10]

However, the actual semantic differential construct underpinning the ASD has many advantages, including greater specificity for attitudes than other existing instruments,[13] efficiency in measuring a complex concept,[15] less potential for response bias,[16] and reported greater reliability and validity compared with Likert scale-based instruments.[17] Without inherent potential for bias found in other instruments utilising positive or negative statements about older people, such as the University of California Los Angeles Geriatric Attitudes Scale,[18] a novel semantic differential instrument should have greater face validity in using pairs of opposite adjectives generated from the vocabularies of current Australian medical students.

In Australia, medical education is undertaken as either an undergraduate bachelor degree or as a shorter postgraduate master's level program. First-year medical students have limited clinical exposure to older people. By third year, all students have had contact with older people during their general clinical rotations, but only some will have experienced rotations in geriatric medicine, which varies by institution.

2 | METHODS

Ethics permission to conduct the study was obtained from the University of Sydney (USYD) Human Research Office (Project number 2015/687). Permission was also provided by the relevant offices of ethics at the University of New South Wales (UNSW) and the University of Wollongong (UOW).

2.1 | Qualitative—Scale development

2.1.1 | Participants

After ethics approval in 2015, third-year medical students from two university medical schools were invited to submit voluntary reflective pieces to describe their attitudes towards older people. As electronic recruitment completely failed, modification of ethics approval was requested and obtained for direct recruitment following teaching sessions. The reflective task was substantially simplified, to be less daunting for potential respondents, and offered to the next cohort of third-year medical students at two medical schools in 2016. A total of 151 students responded: 95 from USYD and 56 from UOW.

Policy Impact

A more thorough understanding of medical student attitudes towards older people should assist educators in geriatric medicine with innovations in undergraduate medical training that encourage positive attitudes, and to advocate for these attitudes to be a course-learning outcome.

Practice Impact

A better understanding of attitudes students hold toward older people will also assist teachers and clinicians who work with older people to reflect upon their own attitudes, with a view to continuous quality improvement in their medical practice. Improved student attitudes is likely to result in higher quality medical care for older Australians.

TABLE 1 Frequency of word use in medical students' brief reflections on older people

Word	Frequency	Word	Frequency	Word	Frequency
Frail	57	Talkative	22	Dependent	11
Wise	54	Vulnerable	18	Family	11
Experienced	44	Caring	16	Risk	11
Lonely	26	Retired	16	Chatty	10
Old	26	Slow	16	Confused	10
Kind	24	Helpful	15	Happy	10
Knowledgeable	24	Elderly	13	Tired	10
Fragile	23	Polypharmacy	12		
Friendly	22	Co-morbidities	11		

2.1.2 | Item development

Participants were asked to list up to ten descriptive words or phrases which they might use to describe their attitudes towards older people. We collected 318 different adjectives from students. Qualitative analysis of the words was performed, assisted by NVivo software[19] to establish word frequencies. Twenty-five words used by the students had a frequency of ten or more, forming the foundation for building the Australian Ageing Semantic Differential (AASD) (see Table 1).

An iterative approach was employed to develop bipolar scales for the new instrument. The words "old," "elderly" and "retired" were eliminated as it was felt that their inclusion was not useful. Three of the authors (MW, IW and SK) reached concordance on the words to be included. Groups of synonyms or linguistically overlapping words were either eliminated if repetitive, or distilled to synthesise the words agreed upon to best capture the students' original language. The resultant words were then discussed in relation to linguistic contrast and psychological bipolarity, as required for development of a semantic differential[15,20] by an expert panel of five medical professionals working in aged care (one geriatrician and four general practitioners). The panel was chaired by the principal investigator. The Compact Oxford English Dictionary[21] and Oxford Compact Thesaurus[22] were used as resources to facilitate unanimous agreement on the evolving bipolar scales, and to select the few remaining antonyms required to complete the opposite end of scales anchored by student-derived adjectives. The resultant prototype of the AASD contained 20 item pairs of opposite adjectives.

The AASD survey form was designed with six circles between each pair (scale) of opposite adjectives, requesting the respondent to shade in the circle on the scale most closely aligned with their immediate negative or positive attitudinal judgement regarding the social object: a person over 70 years old. Scores ranging from 1 to 6 result from each specific item-pair judgement, with the highest score allocated when the circle is shaded at the "positive" end of the scale. The completed survey form was designed to be read manually or electronically (see Figure 1).

2.2 | Quantitative—Factor structures

2.2.1 | Pilot study

Pilot testing of the prototype AASD instrument was conducted in late 2016, with a sample of UNSW third-year medical students, randomly recruited to complete the survey. By the ethics protocol, tacit consent was assumed as given when students voluntarily completed the survey. Three large tutorial groups were approached, with the aim of recruiting over 100 students to assess the pilot instrument's internal reliability and usability. Demographic data were not collected for the pilot. Students were invited to complete the survey by a research assistant or university staff member, on completion of a lecture or tutorial.

2.2.2 | Main study

In late 2017 and early 2018, a second and larger study, designed to recruit sufficient medical students to establish the factor structure for the AASD, was conducted across three New South Wales medical schools: UOW (first- and third-year students); USYD (first-year students at three clinical schools and third-year students at one clinical school); and UNSW (third-year students). The aim was to recruit a sample of over 300 students from the three medical schools: a sample size sufficient for exploratory factor analysis (EFA). The survey sample group were from both undergraduate (UNSW) and graduate (UOW and USYD) medical programs. Recruitment occurred as in the pilot study. Three versions of the AASD were offered randomly to students, to identify potential response bias due to sequencing of items within the form, a critically important step in development of a semantic differential.[15] The three different versions of the AASD survey form were as follows:

1. Standard, as used in the pilot study, with positive adjectives in alphabetical order on the left-hand side of the survey form, commencing with "easy-going," and negative adjectives to the right of each scale.
2. Reversed alphabetic order, commencing with "wise." Otherwise the form had the same structure as the standard form.

Australian ageing semantic differential

Your Age (In years) is _____   Please indicate your sex (Circle)   Male   /   Female

Below is a list of 19 polar opposite adjectival pairs on a 6 – point scale. When you think about a person over 70 years of age, please indicate by shading the circle position on the scale that best represents the direction and intensity of your judgement about the person being rated:

E.g.,   Optimistic   ○ ○ ● ○ ○ ○   Pessimistic

Make each item a separate and independent judgement. Don't worry about how you have marked any previous items, and don't think too much about any of the individual items. It is your immediate thoughts that are most important. Please make sure that you mark each of the nineteen items on the scale.
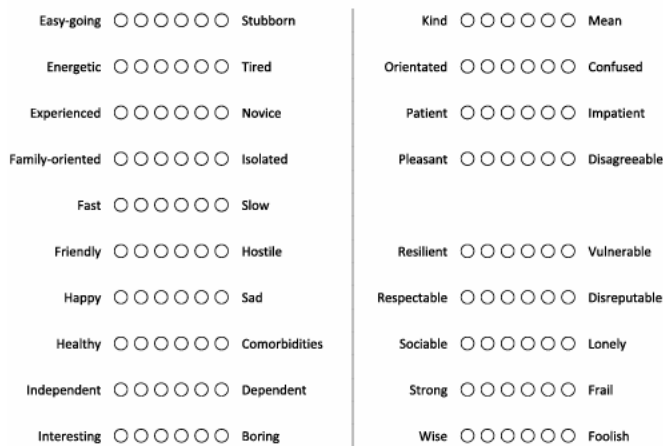
Easy-going	○ ○ ○ ○ ○ ○	Stubborn		Kind	○ ○ ○ ○ ○ ○	Mean
Energetic	○ ○ ○ ○ ○ ○	Tired		Orientated	○ ○ ○ ○ ○ ○	Confused
Experienced	○ ○ ○ ○ ○ ○	Novice		Patient	○ ○ ○ ○ ○ ○	Impatient
Family-oriented	○ ○ ○ ○ ○ ○	Isolated		Pleasant	○ ○ ○ ○ ○ ○	Disagreeable
Fast	○ ○ ○ ○ ○ ○	Slow				
Friendly	○ ○ ○ ○ ○ ○	Hostile		Resilient	○ ○ ○ ○ ○ ○	Vulnerable
Happy	○ ○ ○ ○ ○ ○	Sad		Respectable	○ ○ ○ ○ ○ ○	Disreputable
Healthy	○ ○ ○ ○ ○ ○	Comorbidities		Sociable	○ ○ ○ ○ ○ ○	Lonely
Independent	○ ○ ○ ○ ○ ○	Dependent		Strong	○ ○ ○ ○ ○ ○	Frail
Interesting	○ ○ ○ ○ ○ ○	Boring		Wise	○ ○ ○ ○ ○ ○	Foolish

FIGURE 1   The Australian Ageing Semantic Differential (AASD). Each item of the 19–item-pair AASD scale attracts a possible high score of 6 down to the lowest possible score of 1. The most positive AASD score possible = 114

3. Inversion of the standard form, with negative adjectives on the left, commencing with "stubborn," and aligning positive adjectives on the right.

Data were collated and coded by the principal investigator. The AASD data set was treated as if there was no a priori factor solution for the complex concept of student attitudes towards older people, and subjected to EFA with IBM SPSS Statistics 21,[23] for the purpose of developing a factor model.

From a target group of 442 first- and third-year medical students at the three institutions, completed survey responses were obtained from 321 (see Table 2).

3 | RESULTS

3.1 | Pilot study

The response rate was 77% (140/180 third-year UNSW medical students). The pilot instrument had demonstrable usability. Surveys took 5–10 minutes to complete, with one hundred per cent completion. Cronbach's $\alpha = 0.83$ for the 20-item pilot instrument. Alpha improved to 0.84 after removal of one redundant item pair, Quiet-Talkative, with no measurable improvement on removal of any other item pair. On the final 19 scale instrument, the mean AASD score for the pilot group was 72.1, standard deviation 10.0 and range 45–100 out of a possible score of 114, indicating positive student attitudes (scores > 67 are considered positive). EFA of the data obtained for the 19 pair AASD instrument indicated either a three- or four-factor structure.

3.2 | Main study

The mean age of participants was 25.0 years, standard deviation 4.5 years and range 19 to 50 years. Other demographic data are described in Table 3.

High usability of the survey forms was again demonstrated by the low number of incomplete forms with one or more responses missing or shaded incorrectly.

Importantly, there was no difference in mean total AASD scores for the three groups of students randomly offered either standard, reversed or inverted versions of the AASD form, as determined by one-way ANOVA, $F(2,318) = 1.7, P = 0.177$.

TABLE 2 Main study sample size and response rate by institution and year of study

Institution	Response rate (%)
University of Sydney	
First year	111/124 (90)
Third year	18/50 (36)
University of Wollongong	
First year	70/80 (88)
Third year	61/78 (78)
University of New South Wales	
Third year	75/110 (68)
Three Institutions Combined	
Completed surveys	321/442 (73)
Incomplete surveys	14/442 (3)

TABLE 3 Age and gender of Australian Ageing Semantic Differential main study participants

	n (%)
Age	
19–24 years	176 (55)
25–29 years	101 (31)
30–34 years	28 (9)
35 years or older	11 (3)
Not given	5 (2)
Gender	
Male	148 (46)
Female	138 (43)
Not given	35 (11)

TABLE 4 Mean and standard deviation for each item pair in the Australian Ageing Semantic Differential

Item pair			
Positive	Negative	Mean	SD
Easy-going	Stubborn	3.3	1.1
Energetic	Tired	2.8	0.9
Experienced	Novice	4.9	0.8
Family-oriented	Isolated	4.2	1.1
Fast	Slow	2.4	0.8
Friendly	Hostile	4.6	0.9
Happy	Sad	3.9	0.8
Healthy	Co-morbidities	2.5	1.0
Independent	Dependent	3.3	1.0
Interesting	Boring	4.5	1.1
Kind	Mean	4.6	0.8
Orientated	Confused	3.7	1.0
Patient	Impatient	4.1	1.1
Pleasant	Disagreeable	4.4	0.9
Resilient	Vulnerable	3.9	1.2
Respectable	Disreputable	4.9	0.8
Sociable	Lonely	3.7	1.1
Strong	Frail	2.9	1.0
Wise	Foolish	4.8	0.8

SD, standard deviation.

Across the entire study population, the mean AASD score was 73.2 (standard deviation 10.0), a positive global attitudes score similar to that of the pilot study, with range of scores from 31 to 103. Very good internal reliability for the AASD was demonstrated: Cronbach's $\alpha = 0.86$.

Mean AASD score did not differ by gender, as determined by one-way ANOVA comparing female, male and no-gender-identified groups, $F(2,318) = 1.3$, $P = 0.279$.

Mean AASD score also did not differ by age, determined by one-way ANOVA, $F(4,320) = 1.8$, $P = 0.132$, comparing students stratified into groups by five-year age bands.

The individual item statistics can be viewed in Table 4.

The Bartlett test of sphericity had a chi-squared value of 2052 (df=171, $P < 001$), and the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.857 (> 0.5), both indicating that factorability was appropriate.

Four factors were found to have an eigenvalue > 1, contributing to 56% of the total variance. The Cattell scree plot was consistent with a four-factor solution (see Figure S1). Principal component analysis was used for extraction of components. Promax rotation was used to rotate the matrix of loadings to obtain oblique factors, as every item correlated with at least one other item by 0.36, suggesting factorability, and there was a degree of cross-loading, with 9 of 19 factors loading >0.40 onto two or more factors. The four-factor solution was preferred, with all indicative items having primary loadings > 0.50. The structure matrix of loadings for individual items within the four factors can be seen in Table 5.

The items may be grouped into four factors:

1. Factor 1: The "Instrumentality" factor, responsible for 30% of variance, with primary loadings on the items "energetic," "fast," "healthy," "independent," "orientated" and "strong." Cronbach's alpha for this factor was 0.82.
2. Factor 2: The "Personal Appeal (PA)" factor, responsible for 13% of variance, with primary loadings from "easy-going," "friendly," "interesting," "kind," "patient" and "pleasant." Cronbach's alpha = 0.79.
3. Factor 3: The "Experience" factor, responsible for 7% of variance, with primary loadings from "experienced," "respectable" and "wise." Cronbach's alpha = 0.67.
4. Factor 4: The "Sociability" factor, responsible for 6% of variance, with primary loadings from "family-oriented," "happy," "sociable" and "resilient." Cronbach's alpha = 0.67.

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| Item | Component | | | |
	Factor 1 Instrumentality	Factor 2 Personal Appeal	Factor 3 Experience	Factor 4 Sociability
Energetic	0.727[a]			
Fast	0.761			
Healthy	0.724			0.338
Independent	0.740			0.418
Orientated	0.697	0.358	0.352	0.307
Strong	0.690			0.420
Easy-going		0.683		
Friendly		0.742	0.357	0.406
Interesting	0.407	0.589	0.555	
Kind		0.720	0.470	0.435
Patient		0.663	0.325	
Pleasant		0.781	0.456	0.381
Experienced			0.718	
Respectable		0.401	0.727	0.494
Wise		0.399	0.801	
Family-oriented			0.337	0.732
Happy		0.513		0.678
Sociable	0.359	0.395		0.738
Resilient	0.442		0.307	0.623

TABLE 5 Results of principal component analysis using Promax rotation with Kaiser normalisation—structure matrix showing item loadings for four factors of attitude

Factor loadings < 0.3 have been deleted from the table.

[a]Items in bold type have the highest primary loading for each factor.

Further analysis of the AASD data within the four factors representing four domains of medical student attitudes has revealed the following three notable results (AASD factor subscores were obtained by simple addition, and not weighted):

1. The factor with proportionally lowest mean AASD subscore was Factor 1, Instrumentality. This factor had a mean score of 17.6 from possible total subscore of 36. Therefore, fewer than 50% of respondents made positive judgements for items within the instrumental factor. The other three factors all had positive mean subscores (PA 25.5/36, Experience 14.6/18 and Sociability 15.6/24).
2. When factor subscores were compared by gender, women were found to have a significantly higher mean subscore for the Experience factor than men and students who did not identify gender, as demonstrated by one-way ANOVA, $F(2,320) = 6.7$, $P = 0.001$. No gender differences were apparent on any other factor.
3. Study participants in the 30- to 34-year-old age band had significantly higher mean Instrumental factor subscore, 19.8/36, than participants in other age groups, one-way ANOVA, $F(4,320) = 3.2$, $P = 0.014$. No other significant differences in subscores by age group were apparent.

4 | DISCUSSION

We have described the successful, step-wise development of the AASD. This instrument has been shown to be usable by Australian medical students, taking 5-10 minutes to complete, with very few incomplete responses within the large group sampled. The AASD is efficient, with 19 opposite word pairs, compared with 32 in the original ASD. The AASD was internally reliable, both in the pilot ($\alpha = 0.84$) and in the larger factor study that sampled students randomly across UOW, USYD and UNSW medical schools ($\alpha = 0.86$). The AASD survey instrument was generalisable across three NSW institutions and two years (first and third) of medical courses at UOW and USYD.

The AASD has construct validity, with nomological validity from the words derived from Australian medical students' written descriptions of older people. Face validity for the AASD was ensured by the iterative approach taken to develop the students' own words into a set of scales, successively agreed upon by three co-investigators and then by five Australian content experts.

Semantic differential instruments require testing for contextual contamination and the possibility of response bias due

to survey form sequencing.[24] Particular attention was paid to this step by randomly assigning three versions of the AASD to participants in the factor study. A fundamental requirement for validating the new instrument was confirming no significant difference in mean AASD responses to each of the three form types, demonstrating the AASD does not appear vulnerable to contextual contamination. Future research with the AASD, utilising more variations of the form, could provide additional evidence for consistent internal reliability and absence of response bias. We note that response bias was never evaluated for the original, widely used ASD, which lists all positive adjectives on one side.

The four-factor model preferred for the data provides a deeper understanding of Australian medical student attitudes towards older people than previously possible. Medical student attitudes as determined by the AASD may be conceptualised within four domains: Instrumentality, PA, Experience and Sociability. We elected to keep the Instrumentality (I) factor name from the original ASD, although only two of the original nine words were kept: "strong" and "healthy." Also, in re-using the PA factor name in the AASD, only two of fourteen original words from the ASD were retained within this factor: "pleasant" and "friendly." The word "happy," originally allocated to the PA factor of the ASD, was placed in the Sociability factor of the AASD. Thus, only six of the original thirty-two word pairs of the ASD are found in the AASD. The AASD uses 13 new bipolar item pairs and introduces two new domains within which attitudes are measured: Experience (E) and Sociability (S).

Positive global findings for student attitudes from our AASD study are consistent with those from earlier Australian work indicating attitudes tended to be neutral to positive.[25,26] The highest mean individual item scores within AASD survey data (See Table 4) show students' positivity is multifaceted: older people have experience, respectability and wisdom, and are kind, friendly and interesting.

Medical students had measurably negative views on the instrumentality of older Australians. Students are more likely to think that older Australians are tired, slow, frail or have co-morbidities (see Table 3). This is not surprising, seeing that much of the exposure medical students have to older people during their medical training is in a hospital setting, providing a skewed perspective of normative ageing.[27] Negative attitudes measured in our Australian sample may in part have similar underlying cause as deterioration in attitudes during medical school reported from a longitudinal study conducted in the United States.[28]

Another very interesting finding from the factor study was that female students rated experience of older people more highly than male students, having significantly higher mean Experience factor subscores than their peers. A recent review examining doctor and medical student attitudes towards older people identified twenty-eight studies describing a possible relationship between female gender and attitudes. Eighteen studies identified no relationship, but ten studies demonstrated a significantly positive relationship between female gender and attitudes.[29] Further research to clarify and further explore any underlying reasons for gender difference in attitudes is warranted.

It is uncertain why students aged between 30 and 34 scored significantly higher on the Instrumental factor of the AASD than younger or older students. The very small number of students 35 years or older in age in our sample precludes clearer understanding. International studies to date have not revealed a consistent relationship between age and medical student attitudes.[29]

5 | CONCLUSIONS

The AASD is a reliable instrument for the measurement of Australian medical student attitudes towards older people in New South Wales. We have demonstrated evidence for construct and face validity. The results from another study we have undertaken including AASD survey data from four states of Australia, as yet unpublished, will provide further evidence for robustness of the AASD factor structure. This study will also investigate attitudes of students by respective medical schools, year of medical study, and undergraduate vs graduate courses.

One logical progression of this work will be to study the effect of curriculum innovations, which address negative areas of attitude held by medical students towards older people, especially the perception of poor instrumentality. It is also important to investigate and foster positive domains of attitude, for example the relatively high value female students place on older people's experience. Another important area of research will be to investigate whether there is a relationship between age and attitudes, controlling for the effect of being an undergraduate or postgraduate medical student, and exposure students have had to healthy older adults. Optimising attitudes of future cohorts of Australian medical graduates can only benefit the medical profession. Finally, the most important beneficiaries from positive medical student and medical professional attitudes will be older Australians, who deserve the highest quality of care.

5.1 | Limitations

More evidence for the AASD factor structure is required, in particular that the four-factor model can be replicated. Data from a larger Australian study yet to be published will provide further evidence for generalisability and validity of the AASD.

The AASD instrument was deliberately not compared with other attitudes scales. Despite being a potential weakness for validation of a new quantitative instrument, we did not believe demonstrating correlation with another scale would be constructive. Acknowledging some correlation between commonly used attitudes scales in a recent Brazilian study,[30] our critical review of the international literature concluded there was insufficient evidence for validity of any of these scales in the Australian context.[10]

From a pragmatic perspective, further research is required to investigate longitudinal correlations between medical student attitudes towards older people, developing professional identity and graduate clinical practice.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Conclusion

The AASD has been shown to be a very usable instrument with high response rates during its development in both pilot (n=140, response rate 77%) and in the main study (n=321, response rate 73%). There was a low incomplete response rate in the main study (3%). Internal reliability of the instrument has been very good, with Cronbach's alpha 0.84 in pilot and 0.86 in the main study. The AASD survey instrument was generalisable across three NSW medical schools, and two different years of medical courses. There was evidence for construct and face validity. There was no evidence for response bias due to survey sequencing, with no difference in mean AASD scores between student groups offered standard, reversed or inverted versions of the form.

Globally, Australian medical students have positive attitudes, as determined by the AASD (Mean AASD = 73.2/114). This resonates with some of the findings from earlier Australian work done in this area. The mean score is similar to that obtained in the pilot study. A four-factor model of medical student attitudes was found to be preferred on exploratory factor analysis of the survey data obtained in the main study. These factors are Instrumentality, Personal Appeal, Experience and Sociability. There has been a substantial change in the AASD factor structure as compared with the original ASD, with only six of the thirty-two original ASD word pairs retained in the AASD and two new factors introduced within the AASD (Experience and Sociability).

Analysis of the cross-sectional data begins to point us to trends in attitude in a more granular manner. Whilst these trends are only based on observational data, they will guide future

research in this area designed to provide a deeper understanding of attitudes. The most important demographic trends observed in this study have been:

1) The majority of Australian students have negative regard for the instrumentality (effectiveness/competence) of older people.

2) Female Australian medical students were found to have a significantly higher regard for the experience of older people as compared with male students and students not identifying gender.

We believe that the AASD has sufficient reliability and validity to be used to in future research, including the investigation of the effects of curriculum innovations which may be introduced to improve the attitudes of medical students towards older people. The four-factor model of attitudes remains to be further confirmed by a subsequent study of Australian medical student outside NSW, but indications are that this model will provide important granularity in understanding attitudes. It is vital that future research seeks to elucidate any underlying causes for the development of both positive and negative attitudes towards older people, with the aim of optimising medical graduate attitudes, for the benefit of all older Australians.

Chapter 6: A Cross-sectional Study of Australian Medical Student Attitudes Towards Older People Confirms a 4-Factor Structure and Psychometric Properties of the Australian Ageing Semantic Differential.

Abstract

Objectives: The Australian Ageing Semantic Differential (AASD) survey was developed to quantify medical student attitudes towards older people. The purpose of this study is to examine psychometric properties of the survey and confirm its factor structure of four composites.

Design: Cross-sectional study

Setting: Three medical schools in three Australian states: Victoria, Western Australia, and South Australia.

Participants: Third or fourth-year medical students (n=188, RR 79%).

Outcome measures: In the previous AASD study, exploratory factor analysis (EFA) supported a 4-factor model consisting of 'Instrumentality'(I), 'Personal Appeal'(PA), 'Experience'(E) and 'Sociability'(S). Congeneric one-factor CFA were used to examine model fit for factors using a new student sample (n=188).

Psychometric properties of survey items and factors.

Post hoc analysis of pooled data from this study and earlier AASD study (n=509).

Results: Indices of fit (comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation(RMSEA), standardised root mean square residuals (SRMR)) for data to the factor model were: PA adequate fit (CFI= 0.94,TLI=0.89, RMSEA=0.11, SRMR=0.05), I good fit (CFI=0.99, TLI=0.99, RMSEA=0.04, SRMR=0.03), S good fit (CFI=0.98, TLI=0.95, RMSEA=0.06, SRMR=0.03), E excellent fit (CFI=1.0, TLI=1.0, RMSEA=0.00, SRMR=0.01).

The AASD was internally consistent (Cronbach's α = 0.84), without difference in mean student scores by institution. Mean AASD score was positive for medical students outside NSW (73.2/114).

Mean Instrumentality score for all Australian students was negative, with female respondents' mean Experience score significantly higher than their counterparts. A positive correlation between student age and Instrumentality score was noted.

Conclusions: The AASD is internally consistent and generalisable within Australia, with acceptable structural validity for measuring medical student attitudes towards older people within a four-factor model. Student attitudes were positive globally and within all factors except Instrumentality. Female students rated older persons Experience more positively. Older students recorded more positive attitudes towards Instrumentality of older people.

Article Summary

Strengths and limitations of this study

- The study outlines psychometric properties of the Australian Ageing Semantic Differential (AASD), a recently developed instrument for quantifying Australian medical student attitudes towards older people.

- Confirmatory factor analysis of new medical student AASD survey data, obtained in three other states of Australia outside the state where the instrument was originally developed, was used to test structural validity of the original 4-factor model.

- Statistical analysis of pooled AASD survey data from first, third and fourth-year students from six Australian medical schools in four states, provides evidence for generalisability of the instrument within Australia, and insights into attitudes of Australian medical students towards older people.

- As this study makes use of AASD survey of a convenience sample of students from six of nineteen medical schools in Australia, a more comprehensive study in future may result in evolution of the factor model for student attitudes towards older people.

- As this has been a cross-sectional study, any demographic trends for student attitudes observed will need to be clarified by further research.

Introduction

Attitudes towards older people will drive clinical practice. In 2012, an opinion piece entitled "Time to end ageism in medical education" was written by a Canadian medical student [1]. We echo this call for change, and believe that a better understanding of Australian medical

student attitudes, assisted by quantitative, qualitative and mixed methodology research, will help direct medical curriculum innovations designed to foster optimal medical graduate attitudes towards older people. Optimisation of medical practitioner attitudes will reduce the effects of ageism extant in the current Australian health care system. This paper describes a study designed to confirm the factor structure of the Australian Ageing Semantic Differential AASD), a novel survey instrument developed as the result of identifying the need for a modern, 'fit for purpose' measure of Australian medical student attitudes towards older people. The study was also critical in order to demonstrate generalisability of the AASD across medical schools within Australia, as hitherto the instrument had only been employed in New South Wales, where it was recently developed.

The Australian Human Rights Commission advocates for human rights training of health workers to improve health service delivery for the aged "…delivered in a manner that is non-discriminatory and promotes equality; ensures that services are available, accessible, appropriate and of good quality"[2; p.1]. Medical student attitudes will naturally reflect those of wider society, with ageist views widespread across cultures [3]. Older people may feel patronised, struggle with accessing health and other community services, and may feel marginalised from the community because of age discrimination [4]. Societal stereotyping explains why even first year medical students have been reported to have negative attitudes towards older people [5].

In addressing societal stereotypes around age, medical curricula need to evolve in order that their structure and context do not unintentionally engender negative student attitudes towards

older people. Medical courses are grounded in specialty hospital rotations with inpatient demographics skewed towards older and sicker people, often perceived by students as complex to assess and treat, more fragile, and having communication difficulty [6]. Unsurprisingly, longitudinal deterioration in attitudes to older people during medical training has been described [7]. Younger people often view physical loss of function with age as normative [8]. Medical students need reminding during training that the majority of Australians over 65 years of age feel they have good, very good or excellent health [9]. Role modelling by clinical teachers via the 'hidden curriculum' shapes medical student professional development [10]. Ageist stereotypes are displayed by doctors during some interactions with older patients [11]. Whilst a positive trend for Australian medical practitioner attitudes towards older people has been quantified [12], one qualitative study has revealed Australians may perceive age discrimination within the healthcare system [13]. An example of systemic discrimination is the dwindling proportion of general practitioners (GPs) treating older people in aged care facilities (ACF), with half or fewer prepared to take on this role [14,15]. A recent Australian Medical Association member survey found over a third of doctors surveyed planned to stop taking new patients in ACF, reduce the number of visits or stop ACF work completely over the next two years [16]. A recent qualitative study of Australian GP's perceptions identified poor remuneration, logistic issues, system inefficiencies and inadequate training as potential obstacles to treating older people in ACF [17].

Review of the relatively sparse literature published on Australian medical student attitudes toward older people found these to be measurably neutral to positive. Findings from

qualitative research into student attitudes also captured by the review were mixed, with negative themes of nihilism, paternalism, communication challenge, perceptions of high morbidity and reduced quality of life [18]. The reliability and validity of employing US developed instruments to quantify Australian student attitudes is uncertain, as described in our critical review of these quantitative measures [19].

To briefly summarise our review papers, the small number of Australian studies of medical student attitude to date have utilised either the University of California Los Angeles Geriatric Attitude Scale (UCLA-GAS) [20] or the Aging Semantic Differential (ASD) [21]. The UCLA-GAS is an explicit, statement- based survey, which has been criticised as measuring beliefs rather than attitudes [22], being unbalanced, with more negative (9) than positive (5) statements [23], and with lower internal reliability in studies conducted outside UCLA [23, 24]. As with all explicit survey instruments, the UCLA-GAS may also be subject to response bias, where respondents choose more socially desirable options on the scales. The other widely used instrument for quantifying attitudes of medical students towards older people internationally is the ASD. The construct of semantic differential, where survey respondents indicate intensity and direction of their judgement of a social object on a scale of polar opposite adjectives, has advantages for measuring complex social stereotypes such as attitude. These include greater efficiency [25], more specificity for attitude than statement-based scales, lower likelihood of response bias, and capacity for evaluation of attitudes within several dimensions/factors [26]. Nonetheless, the ASD has several flaws rendering it sub-optimal for use in Australian medical education research. It is an instrument reliant on words from the United States of America lexicon of the 1950s [21], some now ambiguous in

meaning and/or polarity, for example the items Liberal-Conservative and Ordinary-Eccentric. The ASD is also unnecessarily repetitive of item pairs with similar meaning, has sexist origins, and has questions concerning its factor structure. Our conclusion was that a 'fit for purpose' instrument for quantitative research of Australian medical student attitudes towards older people did not exist [19].

Once we had identified a gap in the literature for a reliable, valid and contemporaneous measure of Australian medical student attitudes towards older people, the construct of semantic differential was adopted as most advantageous for development of the new survey instrument. Development of the Australian Ageing Semantic Differential (AASD) was contingent on contemporary Australian medical student language. The fundamental step was to obtain descriptive words for building anchors for the bipolar scales of the instrument, derived from qualitative study of words used to describe older people by third year medical students attending two Australian medical schools (The University of Sydney and The University of Wollongong) in the state of New South Wales (NSW). The AASD scales were developed using an iterative approach. Pilot study of the prototype survey instrument was performed with third year medical students attending the University of New South Wales medical school in late 2016, demonstrating internal reliability and usability for this instrument [27]. A recently published paper describes further development of the AASD from data obtained from surveying students in three NSW medical schools [28]. The AASD consists of 19 pairs of opposite adjectives, and can be viewed in Figure 1.

Our current study utilises survey data obtained during 2018 from medical students in three

states of Australia outside of NSW, to provide robust evidence, utilising CFA, for a four-factor model of attitudes as measured by the AASD: Instrumentality (I), Personal Appeal (PA), Experience (E) and Sociability (S). We also aimed to demonstrate that the performance of the AASD instrument, as judged by internal consistency (Cronbach's alpha) and mean AASD scores and factor scores, was no different in an Australian student sample group from outside of NSW when compared with results from our previous survey of NSW medical students. Finally, pooled data from this study of South Australian, Victorian and Western Australian medical students, together with data obtained from New South Wales students during the AASD developmental study, was subjected to descriptive statistical analysis.

Methods

Study design and date – This study is based on data obtained from a cross-sectional survey using the AASD, conducted during 2018.

Study procedures- Ethics permission to conduct this study was obtained from the University of Sydney Human Research Office (Project number 2015/687). Geriatric education leads at medical schools in five states of Australia were asked for permission to recruit students from their respective school once approval was granted from the relevant institution human ethics office. Three positive responses led to the final geographical footprint for data collection. When sufficient survey responses were obtained from surveying a convenient cluster of tutorial and lecture groups across the three states, further recruitment was ceased.

Patient and public involvement- Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

Setting - Third year medical students from the University of Melbourne (MU) and University of Western Australia (UWA) graduate programs, and fourth year undergraduate students from the University of Adelaide (UA). Students completing face to face tutorials or lectures were invited by way of a written participant information sheet to voluntarily complete the AASD survey following their lesson. As per ethics protocol, consent was considered given when respondents returned a completed form to the research assistant.

Eligibility criteria – Much of the research for development of the AASD has deliberately been conducted with third year medical student participants. This has been because it is preferable to study attitudes once students have experienced clinical contact with older people during their respective medical courses. Australian medical education is either a four-year graduate or five or six-year undergraduate program. We wanted to sample students from both types of program, hence third year student in graduate programs (MU and UWA) and fourth year students in the longer undergraduate program (UA) were eligible for recruitment. All Australian medical programs incorporate general clinical rotations from at least second year. The timing of the surveys was unrelated to when students undertook specific geriatric medicine clinical rotations, which occur variably from school to school, and are not always mandatory. All surveys with an incomplete response to any scale were excluded from the data analysis.

Sample- In Australian medical schools 17051 students were enrolled in 2018, with 11715 enrolled outside NSW. The aim was to survey Australian medical students across at least three states outside of NSW, obtaining a minimum sample size of 30 students from each state

for comparison, together comprising a large enough sample for factor analysis. A total sample size of at least 100 was considered to be the minimum required, providing at least 5 subjects for each of the 19 item pairs (variables) in the AASD instrument, as recommended by Cohen, Manion & Morrison for educational research using factor analysis [29].

Measure- The AASD used in the study was a self-administered, anonymised one-page semantic differential instrument, with 19 pairs of antonyms used to describe older people (See Figure 1). Respondents were asked to shade in the circle on a six-point scale for each of the item pairs, corresponding to their immediate attitudinal judgement concerning a person over 70 years of age, with one the lowest and six the most positive score. The developmental study employed three versions of the AASD, to test for any effects of response bias due to contextual contamination, an important step in the development of a semantic differential [25]. As no response bias was detected, the final version of the AASD has positive adjectives on the left-hand side of the form, and negative adjectives on the right-hand side of the form. The most negative possible AASD attitudinal score is 19 and the most positive score is 114. An AASD score of 67 or greater is considered to indicate globally positive attitudes for the respondent.

Exploratory factor analysis of NSW student survey data indicated a four-factor solution as preferred for the AASD (4). The four factors, in descending order of contribution to variance, are Instrumentality, Personal Appeal, Experience and Sociability. We chose to retain two of the named factors from the original ASD: 1) Instrumentality, with only two of the original nine words kept ("strong" and "healthy"), relating to the respondent's judgement of the

perceived effectiveness or competency of an older person, and 2) Personal Appeal, with two of the fourteen original words retained ("pleasant" and "friendly"). Thus, only six of thirty-two word pairs of the ASD are found within the AASD, with the new instrument using 13 new bipolar item pairs and introducing two new domains of attitude, Experience and Sociability. Scores for each of the four factors are not intended to be weighted. Factor (subscale) scores provide opportunity for investigation of the dimensionality of Australian medical student attitudes towards older people.

In addition, basic demographic data are obtained by the AASD instrument, with respondents asked to identity their age and sex.

Analysis-

Preliminary analysis

Prior to conducting factor analysis, the Kaiser- Meyer-Olkin (KMO) and Bartlett's test of sampling adequacy were determined. KMO was 0.845 and Bartlett test of sphericity had a chi-squared value of 1282.3 (df 171, P < .001), both indicating factorability of the data. All further analysis was conducted using IBM SPSS Statistics 25 [30] and IBM SPSS Amos 25 [31].

Confirmatory Factor Analysis

CFA was performed to evaluate the fit of the original 4- factor AASD model with our new data. We performed four one-factor congeneric CFAs to measure that the covariance of the items in each of these factors are due to a common factor. In a previous study using EFA we

found support for four factors. The factors consisted of two composites with six items (I and PA)), one composite with four items (S), and one composite with three items (E) [28]. While a minimum of three items per factor has been recommended to reliably yield convergent solutions in CFA [32], a three-item factor will be a "just identified" model with zero degrees of freedom. This leads to perfect model fit and as such is less ideal for testing theory [33]. For this reason, we proposed to test the factor structure based on a minimum of 4 items per factor and made one change to the previous factor structure by including the item "interesting" within the E factor instead of the PA factor, a decision influenced by high cross-loading noted for this item to both factors in the previously reported NSW study [28].

Four congeneric CFAs were then conducted for each factor, and model fit was assessed. The I factor consisted of the items energetic, fast, healthy, independent, orientated and strong. The PA factor now consisted of five items, being easy-going, friendly, kind, patient and pleasant. The E factor consisted of four items; experienced, respectable, wise and interesting. The S factor consisted of items family-oriented, happy, sociable and resilient.

Five model fit statistics were used. The chi-square test assesses the fit by comparing the obtained sample correlation with the correlation matrix estimated under the model. Small chi-square values with P>.05 indicates a good fit. The comparative fit index (CFI) and non-normed fit index or Tucker-Lewis fit index (TFI) compare the hypothesized model to a null model. The CFI and TLI values of ≥.95 indicates good fit. The root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMR) reflect how

close the model fits to a reasonably fitted model, and good fit is indicated by values ≤.06 for the RMSEA and ≤.09 for SRMR [34,35]

Internal consistency is a way to gauge how well a questionnaire or survey is measuring what you want it to measure. Reliability for the AASD will be determined through item analysis using Cronbach's alpha. Cronbach's alpha measures the internal consistency of a scale or how closely a set of items are as a group. Cronbach's alpha will be performed on each of the factors from the AASD, to ensure that individuals are responding consistently to items within each subscale. Cronbach's alpha of 0.60 is seen as adequate and Cronbach's alpha of 0.7 and above shows good reliability, indicating higher strength of consistency [36].

Descriptive Statistics

Mean total AASD scores and mean factor scores were obtained for the purpose of comparison of AASD survey measures of attitudes from this study in Victoria, WA and SA (n=188) with the AASD total and factor attitudinal scores measured by the previous NSW developmental study (n=321).

On confirming no significant difference in performance of the AASD instrument across Australian states, further statistical analysis was undertaken, comparing the data by institution, year of course, medical course type, gender and age, using the combined dataset obtained from surveying students in six institutions across four Australian states (n=509).

Results

Study Sample

Fully completed AASD survey responses were obtained from 188 medical students from states outside NSW, from a potential target group of 238 third or fourth years at three university medical schools; MU, UWA, and UA (Response rate 79%). Very few of the student survey responses were incomplete (4/238), and these were excluded from the analysis. Cronbach's α for the 19-item pair AASD was 0.84. Response rates and demographics of the student sample groups were similar to that in the development study conducted previously in NSW (See Table 1).

Table 1: Response rates and demographic characteristics of survey participants by Australian state

Australian State	N	Completed Response Rate (%)	Demographics					
			Age (yrs)			Sex (%)		
			Mean	SD	Range	Male given	Female	Not
NSW * (1st and 3rd year students)	321	72.6	25.0	4.5	19 - 50	46.1	43	10.9
Victoria (3rd year students)	106	75.7	24.0	1.5	22 - 29	53.8	41.5	4.7
South Australia (4th year students)	43	86	22.2	2.4	20 - 34	32.6	65.1	2.3
Western Australia (3rd year students)	39	81.2	24.8	3.6	22 – 40	48.7	51.3	--

*Data previously published [28]

Confirmatory Factor Analysis

Table 2 shows the fit indices for each of the four AASD composites from one-factor

congeneric CFA (See below).

Table 2: CFA model fit indices of AASD

AASD Factors	Model Fit Indices				
	X_2 (p-value)	CFI	TLI	RMSEA	SRMR
Instrumentality	11.5 (0.24)	0.99	0.99	0.04	0.03
Personal Appeal	16.8 (0.005)	0.94	0.89	0.11	0.05
Experience	0.65 (0.72)	1.0	1.0	0.00	0.01
Sociability	3.2 (0.20)	0.98	0.95	0.06	0.03

The AASD factor AMOS model may be viewed in the diagram provided as a supplement to

this paper (See Supplement 1).

Table 3 shows the factor loadings of each of the items to the factors (See below)

Table 3: Factor loadings of AASD composites by CFA

Item	Factors			
	Instrumentality	Personal Appeal	Experience	Sociability
Energetic	0.57			
Fast	0.76			
Healthy	0.83			
Independent	0.67			
Orientated	0.65			
Strong	0.62			
Easy-going		0.42		
Friendly		0.75		
Kind		0.78		
Patient		0.37		
Pleasant		0.65		
Experience			0.56	
Wise			0.80	
Respectable			0.56	
Interesting			0.59	
Family-oriented				0.57
Happy				0.55
Sociable				0.63
Resilient				0.39

The instrumentality items showed good fit with all five model fit indices; factor loadings for each item ranging from 0.57 to 0.83. Model fit indices for the personal appeal factor was only adequate. For this sample, the factor loading for the item patient was lowest at 0.37, contributing only 14% to the variance of this latent factor. Model fit improves significantly when this item is dropped from this factor with $X_2 = 3.9$ (p=0.14), CFI=0.99, TLI=0.97, RMSEA=0.07 and SRMR=0.03. This factor with only four items can be considered as an alternative for this composite. The experience factor with four items has excellent fit with all model fit indices; factor loadings ranging from 0.56 to 0.80. The sociability factor also had good model fits in all five indices, with factor loadings ranging from 0.39 to 0.63.

Cronbach's alpha results for each of the factors (subscales) were all satisfactory: Instrumentality 0.84, Personal Appeal 0.71, Experience 0.71, and Sociability 0.60.

Descriptive statistics

All mean AASD survey scores by university medical school were positive, as can be seen below in Table 4.

Table 4: Mean AASD scores for six Australian university medical schools

Medical School	n	Mean AASD	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	71	73.5	10.0	1.19	71.2	75.9	49.0	99.0
2	122	73.0	9.5	.86	71.3	74.7	51.0	101.0
3	128	73.3	10.5	.93	71.4	75.1	31.0	103.0
4	39	71.2	8.2	1.32	68.5	73.8	51.0	87.0
5	43	70.9	10.1	1.55	67.8	74.0	47.0	94.0
6	106	74.1	9.9	.96	72.2	76.0	51.0	105.0
All states	509	73.1	9.9	.44	72.2	73.9	31.0	105.0

Comparison by independent t testing of the mean AASD obtained from this survey of Victorian, West Australian and South Australian students with the mean AASD from NSW student surveys published previously revealed no difference (t(507)=0.584, p= 0.445.

There was no significant difference in mean AASD score for student groups surveyed at the six Australian medical schools sampled, as determined by one-way ANOVA (F(5,503)=0.996, p=0.42).

There was no difference in mean factor sub-scores by institution or by year of the medical course, when measured by one-way ANOVA analyses. In addition, there were no differences between undergraduate medical student and postgraduate medical student mean AASD scores and factor sub-scores by independent t -testing.

The data for mean total AASD and mean AASD factor scores by age and sex is provided in Table 5. There was no difference in total AASD mean scores by gender or age as determined by one -way ANOVA. The Instrumentality factor had a slightly negative mean score overall. The mean scores for the three other factors were all positive. Female students had a significantly higher mean Experience score than male students and students not identifying gender, by one-way ANOVA (F(2,506)=6.41 , p=0.002).

Table 5: Mean AASD factor and total scores by Australian medical student age and sex

	Instrumental Mean (SD)	Personal Appeal Mean (SD)	Sociability Mean (SD)	Experience Mean (SD)	Total AASD Mean (SD)
Age: 19-24 years (n=318)	17.0 (4.2)	20.9 (3.5)	15.4 (3.1)	19.1 (2.7)	72.5 (9.9)
Age: 25-29 years (n= 140)	17.9 (4.5)	21.1 (3.3)	15.7 (3.1)	19.1 (2.6)	73.7 (9.9)
Age: 30-34 years (n= 31)	19.5 (3.8)	21.8 (2.8)	16.3 (2.3)	19.4 (2.6)	77.1 (8.5)
Age: 35+ years (n= 12)	17.6 (4.7)	21.8 (2.8)	15.2 (2.9)	19.2 (2.9)	72.1 (9.4)
Age: Not given (n= 8)	18.6 (3.2)	19.9 (4.1)	14.3 (2.8)	17.4 (2.3)	71.0 (9.8)
Sex: Male (n=238)	17.4 (4.5)	21.2 (3.5)	15.7 (3.0)	18.7 (2.6)	73.1 (10.2)
Sex: Female (n=230)	17.4 (4.2)	20.8 (3.4)	15.5 (3.0)	19.6 (2.6)	73.3 (9.5)
Sex: Not given (n=41)	17.6 (3.9)	20.7 (3.2)	14.5 (3.3)	18.4 (3.1)	71.2 (9.7)

Student age was found to correlate with the Instrumentality factor score, $r=0.12$ ($p=0.008$).

Discussion

This study has provided robust evidence that the AASD as a measure of medical student attitudes towards older people is generalisable across both undergraduate and graduate medical programs in Australia, and has performed with very good internal consistency in studies to date. As was demonstrated previously by the AASD developmental study findings from student surveys across three NSW medical schools (mean AASD score 73.2/114, Cronbach's $\alpha = 0.86$) [28], this study of medical students outside NSW has again

demonstrated positive Australian medical student attitudes towards older people (mean AASD score 72.8/114, Cronbach's α = 0.84). Independent t testing confirms no significant difference in mean AASD scores of students surveyed outside NSW when compared with their NSW counterparts.

Importantly, additional good evidence for reliability of the AASD scale in measuring attitudes of Australian medical students towards older people is provided by Cronbach's alpha values for each of the factors of the scale, which ranged from satisfactory (Sociability 0.60) to good (Instrumentality 0.84, Personal Appeal 0.71, Experience 0.71)

The four-factor structure of the AASD was demonstrated by CFA of survey data from this study to have acceptable indices of fit, providing evidence for the structural validity of this instrument. Additional evidence for AASD validity from this study builds on evidence for face validity provided by employment of contemporary Australian medical student language in construction of the instrument, as described in our earlier publications [27,28]. There are two important points we would like to make in relation to the current AASD model of attitudes, to acknowledge potential areas of contention:

- We have chosen to relocate the item pair "interesting-boring" within the E factor rather than the PA factor in our model for attitudes because significant cross-loading from this item to E and PA was noted in both the previously reported NSW study and the current study of students outside NSW. The other reason for this small change in factor model, as explained in the Methods section, is the desirability of having a minimum of four items loading to each factor. Finally, we feel that semantically the

proposition that medical students consider how interesting older people are within an experience domain of attitudes is no more or less persuasive than a construct where students' view older people who are interesting within a domain of personal appeal.

- The other item pair which deserves mention is "patient-impatient". The indices of fit for items loading to PA improve significantly if "patient" is removed from the AASD instrument. However, as mentioned above, all items in the AASD were derived from Australian medical student language, using an iterative process. Conceptually, and evident from item loading (See Table 3), "patient" fits within the PA factor of our model. We are thus comfortable leaving "patient" within the existing factor model, accepting the likelihood that this item may well measure something else, perhaps E, in addition to PA.

There was no significant difference in mean total AASD and factor sub-scores by institution or between three different years (first, third and fourth) of the respective medical courses. It is interesting that a decline in attitudes was not noted from first to third or fourth year, which is different to the finding from a recent longitudinal attitudes study conducted in the US, where attitudes were found to worsen during the medical course [7]. Care must be taken in interpreting our data in this regard, as it is based on a cross sectional survey, and not as robust as the longitudinal cohort study. Also, numbers of older students and fourth year students in our study were both relatively small. Ideally, a larger longitudinal Australian medical student cohort study is needed to clarify whether attitudes towards older people change during medical training in this country.

There was no significant difference according to whether the medical course was an undergraduate or graduate program. In addition, there was no significant difference in mean AASD score by gender, whether the student was male, female or not indicating gender. Neither was there a significant difference in mean AASD score according to student age.

For the Australian medical student group as a whole, mean PA and S factor scores were positive. There was no difference in mean scores for these factors by either gender or age.

Whilst the mean E factor score was positive for the entire sample group, female students had significantly higher mean E factor scores than their male peers or students who did not identify gender. This gender difference in attitudes is consistent with some international literature, although the majority of published studies have demonstrated no measurable difference [37]. Our results are similar to one Australian study of Australian hospital doctors, demonstrating gender disparity, with female doctors having more positive attitudes toward older people than male doctors [38]. There is no previously published evidence for gender disparity in Australian medical students' attitudes towards older people. Further investigation is warranted to investigate the influence of gender on student attitudes toward older people.

Notably, over half of the participating students had negative views about the instrumentality, or effectiveness, of older people. These findings are congruent with what is known from the literature, that older people are often considered to be less 'competent' [3]. Australian medical students surveyed were more likely to rate older people as tired, slow, having co-morbidities and being frail. Medical educators should consider curriculum

innovations which emphasise to medical students that many older people are instrumental. Independence and high quality of life during healthy ageing, not disability and nihilism, should be considered normative, as promoted in regions with ageing populations such as Japan and Europe [39,40]. Exposure to healthy older people in the community during medical training should be incorporated within individual medical curricula. For some years, community placements with exposure to healthier older people [41] or 'senior mentoring' [42,43] have been utilised successfully in medical education. A fundamental requirement of such curriculum innovations is high quality contact between students and older people [37].

Interestingly, our data show a mild positive correlation between medical student age and their instrumentality factor score. The weakness of this correlation may in part be due to the fact that the majority of medical students in our study were in a narrow age band between 19 and 29 years of age, with only 10 % of students 30 years of age or older. Nevertheless, this is the first study to describe a positive relationship between increasing Australian medical student age and positive attitudes toward the instrumentality (competency) of older people. This finding is consistent with general theories for ageism; young people prefer their own sub-culture as central to their social identities and the young fear their own mortality [3,8]. A recent systematic review of international literature around medical student and doctors' attitudes towards older patients did not reveal any relationship between practitioner age and attitudes [37]. However, British research has revealed that older medical students are more likely to have a positive attitude to caring for palliative care patients; "When comparing age with attitudes it was found that increasing age was associated with a more positive view of being able to care as opposed to cure patients and a more positive view of listening to

patients"[44]. With an increasing trend for medicine to be taught as a graduate programme in Australia, and the average age of medical graduates increasing, it will be important to further investigate the relationship between medical student age and attitudes towards older people.

Quality and safety are mantra of modern medicine. Medical students are taught principles of quality primary care: Access, continuity, comprehensiveness and co-ordination [45]. While fundamental, these universal principles are insufficient. The Medical Board of Australia's code of conduct emphasises "Good medical practice is patient centred" [46]. Atul Gawande evocatively describes what this means for older people: "…our most cruel failure in how we treat the sick and the aged is the failure to recognise that they have priorities beyond merely being safe and living longer; that the chance to shape one's story is essential to sustaining meaning in life; that we have the opportunity to refashion our institutions, our culture, and our conversations in ways that transform the possibilities for the last chapters of everyone's lives [47;p243]."

Optimising medical graduate attitudes towards care of older Australians should be a core learning outcome for every medical school. Thoughtful reflection upon medical students' attitudes towards older Australians and how these may be shaped, as well as our own attitudes as medical practitioners and powerful role models in medical education, should assist in breaking down ageist barriers erstwhile preventing access to both quality and personalised medical care.

Conclusions

Analysis of survey data obtained from students in attendance at six medical schools across four states in Australia has provided evidence for the structural validity, reliability and generalisability within Australia of the AASD survey instrument. For the first time, medical educators in Australia have access to a modern, 'purpose built' measure of student attitudes towards older people, with a four-factor model by which to investigate the dimensions of attitude in greater detail. As attitudes of students towards older people are a complex social stereotype and a multi-dimensional concept, qualitative investigation will need to be an important component of future research, complementing what is determined quantitatively by utilising the newly validated AASD. Longitudinal evolution of medical student attitudes, influence on future medical practice and career choice, and correlation with knowledge and skills, are all worth studying. Further research quantifying Australian medical student attitudes should investigate the influence of student gender and age on attitudes. It will also be useful to study attitudes of medical graduates, particularly trainees in general practice and geriatric medicine, nascent medical professionals with whom most older Australians will consult in the future.

Limitations

Only medical school students from six of nineteen Australian universities have thus far been surveyed using the AASD, from first, third and fourth year of the respective courses. Stronger evidence for the AASD four-factor model will become available as further research, preferably with a longitudinal cohort study, is conducted into the attitudes of Australian medical students towards older people. It is possible that evolution of the factor model may

occur when more data becomes available, as will our understanding of the possible relationship between student gender or age and attitudes.

We chose not to test for convergent validity after the findings of our critical review of internationally available measures of medical student attitudes towards older people became available. We did not feel that the ASD and UCLA-GAS were reliable and sufficiently valid for use in the Australian setting. This of course means that we were unable to demonstrate the performance of the AASD in comparison with that of other internationally validated measures, a potential weakness in the evaluative process for the new instrument.

Test and retest with the same student group(s) has not been performed with the AASD. Whilst there does not appear to be have been any attempt at this with the original ASD, it is recommended that test-retest is performed if there are concerns regarding the psychometric properties of the instrument being examined [25]. Future research, including a component of test-retest, would improve the robustness of the evidence for test reliability, currently provided by good internal consistency for AASD data from both developmental and confirmatory studies.

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Author statement:

Mark A. G. Wilson is the corresponding author and was responsible for 50% of the work in planning, conduct and write up of the study.

Yvonne Tran was responsible for 25% of the work in planning, statistical analysis and write up of the study.

Susan Kurrle was responsible for 15% of the work in planning and write up of the study.

Ian Wilson was responsible for 10% of the work in planning and write up of the study.

Patient and public involvement: Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research

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Figure 1. The 19 item Australian Ageing Sematic Differential (AASD)

Australian Ageing Semantic Differential

Your Age (In years) is _____   Please indicate your sex (Circle)   Male   /   Female

Below is a list of 19 polar opposite adjectival pairs on a 6 – point scale. When you think about a person over 70 years of age, please indicate by shading the circle position on the scale that best represents the direction and intensity of your judgement about the person being rated:

E.g.,   Optimistic   ○ ○ ● ○ ○ ○   Pessimistic

Make each item a separate and independent judgement. Don't worry about how you have marked any previous items, and don't think too much about any of the individual items. It is your immediate thoughts that are most important. Please make sure that you mark each of the nineteen items on the scale.

Easy-going ○○○○○○ Stubborn		Kind ○○○○○○ Mean	
Energetic ○○○○○○ Tired		Orientated ○○○○○○ Confused	
Experienced ○○○○○○ Novice		Patient ○○○○○○ Impatient	
Family-oriented ○○○○○○ Isolated		Pleasant ○○○○○○ Disagreeable	
Fast ○○○○○○ Slow			
Friendly ○○○○○○ Hostile		Resilient ○○○○○○ Vulnerable	
Happy ○○○○○○ Sad		Respectable ○○○○○○ Disreputable	
Healthy ○○○○○○ Comorbidities		Sociable ○○○○○○ Lonely	
Independent ○○○○○○ Dependent		Strong ○○○○○○ Frail	
Interesting ○○○○○○ Boring		Wise ○○○○○○ Foolish	

With positive adjectives to the left, the highest (most positive) possible respondent score per scale is 6, and the lowest possible score is 1. There is no weighting of items. Thus, for the entire AASD survey instrument, the possible range of respondent scores is between 19 and 114. A positive total score for the AASD is considered to be 67 or greater.

Supplement 1: Supplementary AMOS Data for the Australian Ageing Semantic Differential
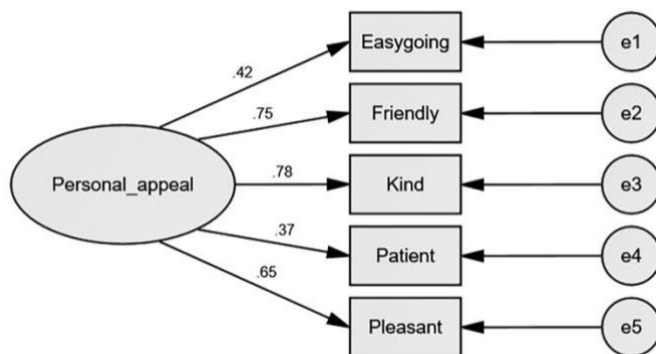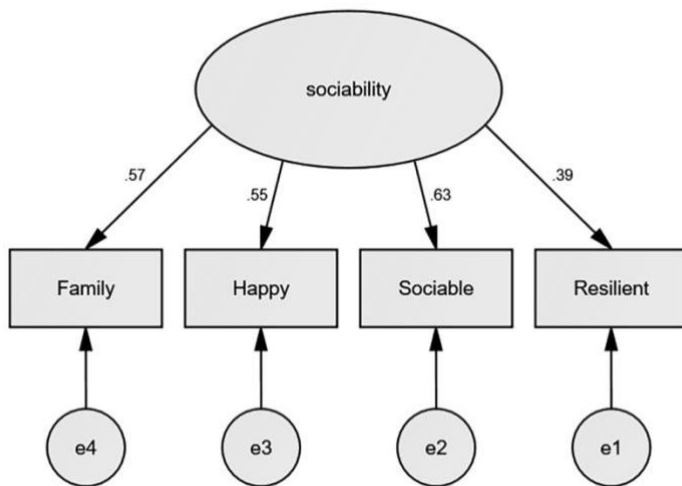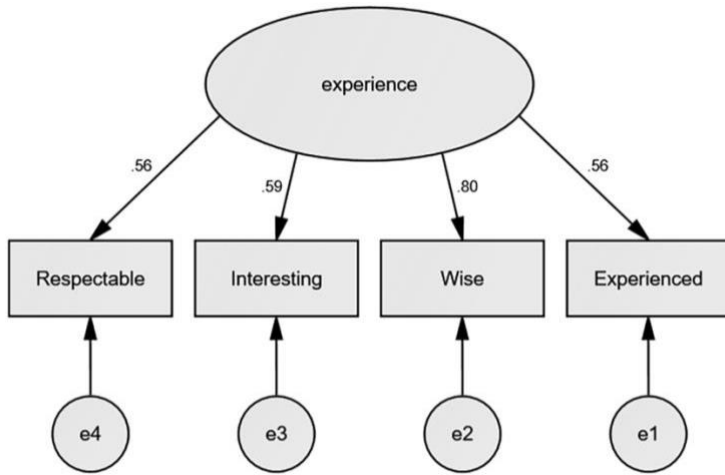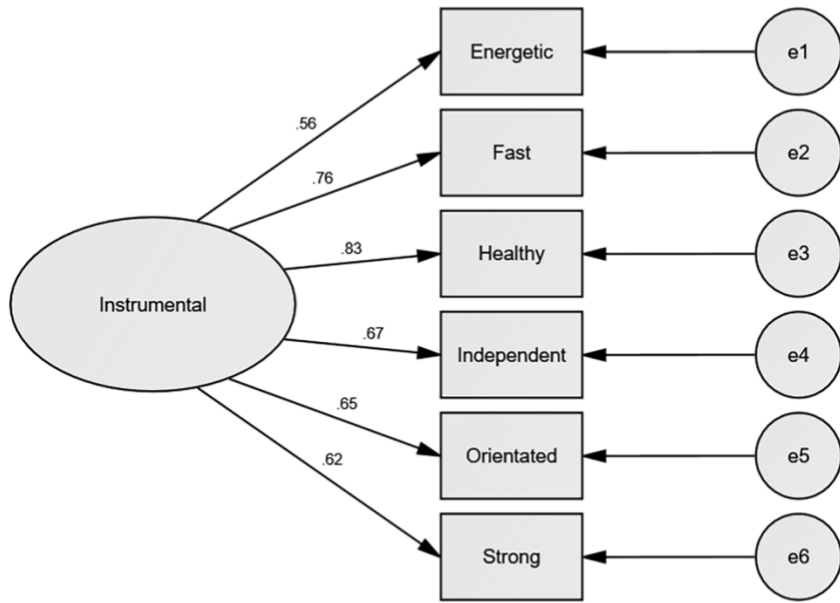
Supplement 2: Descriptive statistics and correlations of the AASD sub-scales (factors)

	Factor 1 Instrumentality	Factor 2 Personal Appeal	Factor 3 Sociability	Factor 4 Experience
Mean	17.46	20.98	15.52	19.09
Standard error of the Mean	0.19	0.15	0.14	0.12
95% confidence Lower Bound	17.08	20.68	15.26	18.86
95% confidence Upper Bound	17.83	21.28	15.79	19.32
Standard Deviation	4.31	3.41	3.05	2.66
Minimum	6.00	9.00	4.00	10.00
Maximum	35.00	30.00	24.00	24.00
Range	29.00	21.00	20.00	14.00
Skewness	0.60	-0.32	-0.20	-0.32
Kurtosis	1.04	0.37	0.16	0.04

		Instrumental	Personal Appeal	Sociability	Experience
Instrumental	Pearson Correlation	1	0.302**	0.515**	0.179**
	Sig.(2-tailed)		0.000	0.000	0.000
	N	509	509	509	509
Personal Appeal	Pearson Correlation	0.302**	1	0.430**	0.480**
	Sig.(2-tailed)	0.000		0.000	0.000
	N	509	509	509	509
Sociability	Pearson Correlation	0.515**	0.430**	1	0.420**
	Sig.(2-tailed)	0.000	0.000		0.000
	N	509	509	509	509
Experience	Pearson Correlation	0.179**	0.480**	0.420**	1
	Sig.(2-tailed)	0.000	0.000	0.000	0.000
	N				

** Significant correlations

Chapter 7: Discussion

7.1 The AASD is a reliable, generalisable instrument for the measurement of Australian medical student attitudes towards older people, with evidence for face and structural validity

The Australian Ageing Semantic Differential (AASD) is a newly developed instrument for quantifying the attitudes of medical students towards older people. The AASD was conceived from first principles, beginning with study of words Australian medical students have chosen to describe older people, forming the foundation for the instrument and underpinning its face validity. No other instrument utilised in Australia for the purpose of measuring medical student attitudes has been subject to the rigorous testing which has been undertaken with the AASD during its development. The AASD provides a very practical, usable instrument, taking 5 to 10 minutes to complete, with a very low percentage of incomplete surveys returned in studies to date (1.7%). The AASD is internally reliable, with Cronbach's alpha 0.84 in the pilot study, 0.86 in the New South Wales (NSW) developmental study, and 0.84 in the confirmatory factor study performed across South Australia (SA), Victoria and Western Australia (WA). As described in Chapters 5 and 6 there is good evidence for generalisability of the AASD as a survey instrument for measuring student attitudes in six medical schools across four states of Australia, and in three different years of medical courses. The AASD measures attitudes within four separate domains: Instrumentality, Personal Appeal, Experience and Sociability. Testing for sequencing bias was also performed, as described in the developmental study in Chapter 5, demonstrating that student responses were not significantly different for three different versions of the survey form employed.

Structural validity has been demonstrated for our 4-factor model of medical student attitudes towards older people by Confirmatory Factor Analysis of data obtained from surveying students from three states of Australia; Victoria, SA and WA, necessarily outside NSW, the state in which the factor model for the AASD was first developed. As described in Chapter 6, one small change in the factor structure, moving the loading of the item pair 'interesting-boring' from the Personal Appeal factor to the Experience factor, has been adopted on the basis of two findings:

1) Cross-loading of 'interesting-boring' to both Personal Appeal and Experience in the two studies described in Chapter 4 and Chapter 5.

2) A preference for at least four items to load to each factor in order to most accurately test and confirm the four-factor model of attitudes by congeneric one-factor confirmatory factor analysis.

The only other potentially contentious item within the AASD construct is the item pair 'patient-impatient'. Despite making the indices of fit appear better for items loading to the Personal Appeal factor if this item pair were removed, as outlined in Chapter 6 both conceptually and in relation to item loading I believe it is preferable to retain this item in the AASD. I accept that this item may well measure aspects of students' attitudes within the Experience factor as well as attitudes within the Personal Appeal Factor. However, I remain very comfortable for future researchers to use the existing AASD structure to examine and further clarify the role of both the 'interesting-boring' and 'patient-impatient' items in the factor model, with any possible future refinement of the instrument based on new evidence that may become available.

Whilst research to date on the AASD has been focused on instrument development and validation, it has relied on observational data, which we acknowledge has limitations for interpretation. However, a total of 509 medical students from six of the nineteen medical schools in Australia have provided a broad cross-sectional sample for analysis. A notable strength of our data is the very good response rates from medical students invited to participate across the four states of Australia sampled, NSW (72.6%), SA (86%), Victoria (75.7%), and WA (81.2%). Whilst this is a convenience sample, and therefore not randomised, large tutorial and lecture groups of students were sampled in an ad hoc fashion from six medical schools, at a juncture in their courses which was deliberately unrelated in timing to any geriatric medicine blocks of instruction. I believe that the data we have obtained has been of sufficient quantity and quality to direct development of the novel AASD instrument.

7.2 Australian medical students have positive attitudes globally towards older people

As explained in Chapter 6, the individual item scores are not weighted, with the lowest score 1 and the highest score 6 for each item. With 19 items, an individual total AASD score equal to or greater than 67/114 (10 items with a score of 4 and 9 items with a score of 3) is thus considered to be positive. Similar calculations may be done for individual factor/subscale scores, where maximum scores possible are: Instrumentality 36/36, Personal Appeal 30/30, Experience 24/24, and Sociability 24/24. Hearteningly, the global measure for student attitudes towards older people, the mean total AASD score, has been found to be both demonstrably positive and not significantly different for NSW medical students (73.2/114) and students surveyed from the other three states (72.8/114).

Students have responded with the highest mean item scores, all greater than 4.5/6, for the items 'experienced', 'respectable', 'wise', 'kind' and 'friendly'. Importantly, from the point of view of generalisability, mean AASD scores were not significantly different across all six institutions sampled. The mean AASD scores for students were also not significantly different across years of the respective courses sampled, namely first, third and fourth year. The latter finding is a two -edged sword. As mentioned earlier in the thesis, there is some international evidence of decline in attitudes during the years of medical education, which was not supported by our more limited cross-sectional data. It is quite feasible that there is actually no measurable difference in attitudes between first, third and fourth years of Australian medical course, as measured by the AASD. This could be due to a number of factors, in particular the relatively small sample sizes for each year, heterogeneity of teaching across the six courses sampled, or that in fact attitudes may not decline during Australian medical courses. Alternatively, if the AASD instrument is not measuring what it is intended to measure, lack of difference in attitude scores raises a reasonable question about its validity. Finally, the students studying either undergraduate and graduate medical programmes had no significant difference in their mean attitude score towards older people.

7.3 Examination of the four factors of attitude provides insight into Australian medical student attitudes towards older people.

Now that the AASD four-factor model has been developed, it is possible to examine several factors of Australian medical student attitude towards older people. Descriptive statistics on the cross-sectional data obtained in the AASD development studies have provided some preliminary insights worthy of further study. In particular there are three findings that are deserving of further attention in medical education research:

7.3.1 *Negative attitudes were most pronounced in relation to the Instrumentality factor*

Fewer than half of the students had positive attitudes toward the ability or competence of older people, as evidenced by the mean Instrumentality score for all respondents in our study being negative (17.5, that is <18/36). Specifically, in relation to items loading to the Instrumentality factor, more than half of the students indicated in their survey responses that older people were 'tired', 'slow', had 'co-morbidities', or were 'frail'.

As has become clear during the course of this research, and is evident from the literature, medical students share with general society one of the most prevalent ageist stereotypes, that older people are often viewed as incompetent [1]. As discussed in the Introduction and Chapters 5 and 6, it is likely that these ageist views are contributed to by at least three well recognised factors:

a) Ageism theory is partly grounded in the concept of the Social Identity Theory, that younger individuals are more likely to evaluate their own age group more positively than older individuals, with whom they are more likely to hold negative attitudes towards [2],

b) Socialisation of medical students usually develops during medical school predominantly by way of hospital clinical rotations, with a case load skewed towards an older and sicker demographic of patients. This engenders a skewed perspective in students that the norm for older people is that they are more unwell, with comorbidities, and that they lack competence in activities of daily life [1,3].

c) Another important factor during medical school is the tacit or hidden curriculum,

whereby medical students learn from modelling clinician behaviours [4]. This can be a double-edged sword, with positive and negative role modelling. With regard to the medical care of older people, ageist elements to care -giving may be observed by students on occasion.

7.3.2 *Female medical students rate older people's Experience significantly more highly*

As has been described in Chapters 4, 5 and 6, our data demonstrates that female medical students rate the Experience of older people significantly more highly than male students or students who did not indicate their gender. Some of the international literature points to evidence for this correlation, but a larger number of studies have identified no relationship [5]. One Australian study found a positive relationship between female gender for hospital medical practitioners and attitudes towards older people [6]. Our research is the first Australian work to indicate a positive relationship between female medical student gender and the domain within attitudes to older people which we have called Experience, that is loaded by the items 'experience', 'wise', 'respectable' and 'interesting'.

7.3.3 *Older students may have more positive attitudes towards older persons' Instrumentality*

There was a mildly positive correlation observed between medical student age and their Instrumentality score. Although a relatively weak correlation, the nature of the medical student population studied has made if challenging to have sufficient data across age bands to compare, as most Australian medical students are under 30 years of age. Once

again, the international literature is unclear with respect to any relationship between medical student age and attitudes towards older people [5]. It is important to clarify this correlation, especially in view of the increasing age at which medical students commence their training, as more Australian institutions move to graduate programmes of medical education. As cited in Chapter 6, there may be a clue provided from the results of a British study of medical student attitudes towards palliative care, which found that older students were more likely to have positive attitudes towards palliative care for patients. The authors concluded that older students were more likely to take a more pragmatic view that providing palliative care took precedence over cure, and they were more likely to take time to listen to their patients [7].

7.4   Where to from here with the AASD? Potential avenues for future research into Australian medical student attitudes and/or practical application in medical education.

7.4.1   Clarification of previous international and Australian medical student attitude study findings

The AASD survey instrument should now facilitate more detailed understanding of the attitudes of Australian medical students towards older people. New insights may be gained from drilling down into the four described factors of attitude; Instrumentality, Personal Appeal, Experience and Sociability. Critics of Rosencratz & McNevin's Aging Semantic Differential [8], including me, have queried its utility partly on the basis of the out of date language it contains [9,10]. The AASD uses up-to-date Australian medical student language, is more efficient than the AASD by 13 fewer word-pairs, and introduces two new domains,

experience and sociability. Investigators in the area of medical student attitudes towards older people have pointed to the possibility of a fourth factor, experience [11,12], an idea which has now been supported by my own research. This is a particularly interesting finding, which should add to richness of knowledge in this area.

There are limitations to interpretation of our research findings in relation to Australian medical student attitudes, because the studies have been conducted as cross-sectional surveys. As discussed earlier, descriptive statistics on the data to date can only suggest possible trends, which require more detailed investigation to provide more definitive evidence. Whilst AASD surveys of six of nineteen Australian medical schools have been conducted, these have been ad hoc and convenient in the manner by which sampling was performed. Subsequent and more comprehensive work is required to build on the preliminary knowledge obtained thus far.

It would be worthwhile to design a longitudinal study of attitudes towards older people which follows a cohort of students from the commencement of medical school into the post-graduate years. Such as study, ideally using mixed methodology, could not only investigate correlations between medical student age or gender with attitudes, but also examine a number of other factors which may influence attitudes. Importantly, future research needs to examine the evolution of attitudes by the time of medical graduation, which may clarify if a decline has occurred during the medical course, and identify possible mitigating factors. This research would also answer the question about validity raised in section 7.2 above. It may also demonstrate if there is any link between medical student attitudes and career decision-

making. There is good evidence that student who have positive attitudes towards older people are more likely to choose a career in geriatric medicine [13].

It would also be worthwhile to see in a country like Australia, where most medical graduates opt to specialise, whether positive attitudes towards older people may influence the decision by graduating doctors to undertake post-graduate training to become general practitioners. General practitioners in this country provide the lion's share of medical care for older people. In the current milieu, more and more GP's are making the decision not to make house calls or visit older residents in aged care facilities [14,15]. It is especially important for medical educators to provide role modelling and to advocate from the earliest stages of medical school for a more positive attitude towards performing this necessary service for the most vulnerable and frail aged in the Australian community. The current Royal Commission into Quality and Safety in Aged Care interim report has made it very clear that attitudes of medical practitioners towards older people requiring care need to significantly improve [16].

The international literature has described a range of relationships between medical student/practitioner attitude and past contact with older people. This contact may either occur before commencing medical school during the students' formative years or in their careers prior to commencement of medical training. A recent systematic review has concluded that prior exposure to older people had mixed influence on medical student attitudes, either neutral or positive, but that attitudes were more likely to be positive if the quality of contact/relationship was taken into consideration [5]

Other factors which may be studied longitudinally in relation to medical student attitudes to older people could include knowledge in geriatric medicine, intrinsic motivation, and personal characteristics such as empathy. It would be a logical hypothesis to propose that correlations are likely to be found between positive student attitudes, empathy and higher levels of intrinsic motivation. One challenge raised has been that in research conducted in an attempt to determine a correlation between student attitudes and knowledge, investigators have used a knowledge score that confounds knowledge with attitudes [5]. Clearly, any research in this area would require careful selection of instruments of measure.

7.4.2 Monitoring and evaluation of undergraduate geriatric medicine curricula

The AASD has significant potential for evaluating the geriatric curriculum at respective Australian medical schools. Indeed, throughout this thesis, I have argued that optimal attitudes towards older people should be a medical course learning outcome, standing alongside adequate knowledge, skills and behaviours in geriatric medicine. One of the greatest challenges to obtaining a reliable assessment of each student's attitudes would be the veracity of the individual student's responses to the AASD if performed in a formative or summative assessment context. As discussed in the introductory chapter of this thesis, it is highly likely that students may self-moderate their responses in order to give what they perceive as the desired responses expected by faculty. It is for this reason that I do not wish to promote the use of the AASD as either a formative or summative assessment tool.

Rather than the focus being on assessment of individual medical student attitudes towards older people, I believe that it would be more practically useful to look at the cohort mean

AASD scores, and sub-scores across all four factors. In this way, innovation in geriatric medicine and the broader curriculum may be driven by perceived strengths and weaknesses which may be identified within a comprehensive suite of domains that includes attitudes. As medical courses naturally evolve over time, evaluation of the impact on attitudes could prove to be a valuable source of feedback for medical school curriculum committees and geriatric medicine course coordinators as they introduce innovations in curriculum aimed at fostering optimal attitudes. For example, there is a body of international evidence that suggests that high quality contact of medical students with healthy older people, from early in their training, may foster positive attitudes [17,18,19]. This is a strategy which is deserving of further investigation in an Australian context.

7.4.3 Positive attitudes towards older people may be studied specifically in curricula in personal and professional development at medical schools

The AASD provides a potential tool to measure the effect of curriculum intervention on final year medical student attitudes, more specifically in the domain of professionalism, complementing other assessment measures that provide data within an attitudinal domain, such as workplace-based assessments, case based learning and summative Objective Structured Clinical Examination. As described in the introduction to this thesis, the Medical Board of Australia has a clearly outlined code of conduct. This code provides important guidelines by which professionalism may be learnt by medical students, in particular around the concepts of patient centred care and shared decision making. For example, in the University of Wollongong Graduate Medicine Phase 3 program, during the penultimate and final years, these principles are discussed in small group work in relation to complex clinical

cases and reflection on how a patient's holistic management occurred, and how this could have been done better. The introduction of more cases involving older people is one curriculum intervention that would align well with the graduate learning outcome of optimisation of attitudes towards older people.

7.4.4   Improved quality and safety of health care provided for older Australians

Ultimately, it will be the translation of medical student and graduate attitudes into the clinical behaviours of medical practitioners that is of most practical importance to the quality and safety of care provided for older Australians. Therefore, it is important to endeavour to demonstrate a correlation between positive attitudes towards older people and measurable parameters of their health care delivery. One area where regulatory authorities are demanding more accountability is in the residential aged care sector, with regular measurement of a number of mandatory quality and safety indicators now a requirement. Investigation of the attitudes of medical practitioners visiting aged care facilities could be correlated with health indicator data for their residents. If this type of research is done as an audit, potentially with continuing professional development credit for medical practitioners, in the spirit of continuous improvement, it need not inhibit their responses. Of course, it would be necessary to validate the AASD for use with medical practitioners in order to conduct such a study. In addition to the quantitative data, qualitative survey of medical practitioners involved in residential aged care could also provide deeper insights to guide the personalised and evidence-based health care provision for older people in this setting.

7.5 The challenges of capturing the true essence of medical student attitudes towards older people

A critical challenge to the study of attitudes will be the engagement of medical school faculty in appreciating the relevance of attitudes of medical students towards older people as a course learning outcome. Optimising attitudes towards older people is as much a goal of personal and professional development as it is an academic attribute, and as such may be perceived by some faculty as a graduate learning outcome sitting low down in the hierarchy of geriatric medicine competency requirements. One of the virtues of quantifying attitudes will be to provide a means of demonstrating to medical faculties the effect of course innovations which encourage positive attitudes, and potential correlations between attitudes and knowledge and skills in geriatrics.

Engaging students with the importance of optimising their attitudes towards older people will not be easy. Medical students may consider development of positive attitudes to be a soft and ambiguous learning objective, with lower relative value. It is likely that they may perceive optimising attitudes towards older people to be of lower priority compared with acquisition of practical skills and knowledge in geriatric medicine. Therefore, it will be important to innovate in undergraduate geriatric medical education in a way that promotes learning about the health care for older people in an integrated fashion, across a full suite of clear learning objectives which include attitudes. As discussed throughout this thesis, it is crucial that the context for learning geriatric medicine must include greater exposure to healthy older people via quality learning opportunities in the community, such as in general practice. As already discussed, teaching geriatrics in hospitals will result in a distorted perspective for students

that older people are for the large part sick and frail [2]. Paradoxically, as most older Australians consider themselves to have good to very good health [20], it is important that medical students understand ageing in place [21], which occurs for the majority of people in their own homes.

It remains a challenge to choose the most appropriate method to study attitudes of medical students, due to the multi-faceted nature of attitude. Having extensively read the literature around medical student attitudes during the course of my doctoral research, there is no doubt in my mind that quantitative data obtained from using the AASD should be complemented by qualitative data obtained by interviews of medical students. A much richer perspective on student attitudes will be obtained by this mixed methodology approach. Encouraging student feedback regarding their clinical experiences with older people will be invaluable in determining the best mix of learning opportunities which geriatric medicine curriculum teams should provide for them at medical school.

The AASD is intended in its written prelude and in the introduction to students who are about to complete the survey, to be completed when contemplating a generic person over 70 years of age. This person is a hypothetical social object, attitudes toward which will be influenced by the types of contact a student has had with older people, both outside and during medical training. One potential limitation of the AASD could be that some students may think about only one older person, with particular characteristics, which may produce stereotypical responses specific only to that person and not towards older people in general. It will be important that any future researchers utilising the AASD provide clear instructions for the

respondents that they are to contemplate their experiences with all older people over 70 years of age.

Another area worthy of further research would be compare medical students' attitudes as measured by the AASD with an implicit psychometric measure such as the Implicit Attitudes Test (IAT) [22], a methodology that has not yet been used in this country in medical education research. Such a study may be helpful in determining if the AASD is prone to response bias, in particular to clarify to what degree medical student responses to the AASD survey may be modulated to be more socially acceptable. Such cross-referencing in future research will be important to provide evidence for the convergent validity of the AASD, which is currently lacking. This will build on the current evidence provided by our studies to date for the internal reliability, face and structural validity of the instrument.

As the AASD has been developed in large part as a more contemporary semantic differential instrument, in an attempt to overcome a number of identified flaws in the existing ASD, it remains to be seen if this instrument may be used in a context outside of Australia. As words for the AASD were derived from Australian medical students, researchers outside of Australia will need to examine the semantics of the instrument in relation to their own setting, and to consider piloting the instrument to determine usability and internal reliability.

It is possible that the AASD may be of future use in surveying the attitudes of students of allied health, nursing and/or post-graduate medical and other health professionals. A cautious

approach would be required if this is to be done, particularly if the instrument were to be used outside Australia. However, as the anchor words obtained for the instrument were derived from Australian medical students, it would be logical that other students and professional groups in Australia would use similar language.

Finally, I humbly propose that the AASD provides a new and improved measure of Australian medical student attitudes towards older people. I believe that the use of contemporary medical student language will now provide new insights into several domains within attitude, which may be helpful to medical educators planning undergraduate geriatric medicine and more general medical course curricula. Further mixed methodology research into attitudes should be undertaken in order to provide data to direct innovations in medical education, with the intention of nurturing medical graduates who will combine quality health care provision with the highest possible personal regard for their older patients.

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