



COVER SHEET

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Motor SMART - a driver education, judgement training and mentoring program for novice drivers with ADHD

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ABSTRACT

It is estimated that between 2% and 8% of Australian children are affected by the condition Attention Deficit Hyperactivity Disorder (ADHD). A high correlation has been found between the disorder and learning difficulties, underachievement, Oppositional Defiant Disorder and Socialisation Disorder. In addition, evidence is emerging internationally that young people with ADHD are over-involved in traffic-related incidents. For example, the research suggests that young people with ADHD are more likely to: drive under-age; be convicted of traffic offences, particularly speeding; have their licences suspended or revoked; be rated by others as being less safe; and be involved in more road crashes.

This paper describes the development of an innovative intervention specifically targeting the driving behaviour of young people with ADHD. A search of the literature failed to locate any existing program that could be used as a suitable model. Consequently, it was necessary to draw on 'best practice' features of interventions in the areas of ADHD, road safety and community-based injury prevention to guide the project. The primary aim of the intervention is to enhance the participant's impulse control, judgement and decision-making while driving. It will feature three components: psychological counselling; specialised driver training; and a mentoring program for use by parents and/or other people involved in teaching learner drivers with ADHD. Local individuals and organisations with an interest in the disorder, training or transport have formed a Project Reference Group to develop and guide the project. An evaluation framework is currently being designed which will involve monitoring the offence and crash rates of the participants.

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) was first described almost 100 years ago and, in North America, has been diagnosed and treated for 40 years (1). It is widely recognised as a biological condition (2) and is not caused by diet, parenting or food additives (1). Australian studies indicate that between 2% and 8% of Australian children have the disorder (2, 3). In North America, the incidence has been quoted at between 5% and 20%. The condition is strongly hereditary with boys being more affected than girls (1,4). It is believed that around 60% of people affected by ADHD as children will carry some symptoms into adulthood (1).

ADHD is characterised by a subtle difference in the fine-tuning of the normal brain. This difference seems to be related to a slight imbalance in the brain's message transmitting chemicals (neurotransmitters) (1). PET and SPECT scans show a slight difference of function in the behaviour inhibition areas of the brain – the frontal lobe and its close connections. Studies have found a relationship between ADHD and a range of problems including learning difficulties, underachievement, Oppositional Defiant Disorder and Socialisation Disorder (2,4). The close association between ADHD and other disorders complicates the diagnosis and treatment of the condition (3).

In diagnostic terms, ADHD is distinguished by symptoms of inattention, hyperactivity-impulsivity or a combination of the two (3). Behaviours associated with the disorder in childhood include difficulty sustaining attention, difficulty organising tasks, distractability, forgetfulness, difficulty in inhibiting motor activity, overactivity, poor coordination and specific learning disability (1,3,4). Adults with the disorder often experience problems in relation to organisation, impulse control, focussing, maintaining attention and identifying priorities (1). They also report more lifestyle-related problems including greater illegal substance abuse, more frequent changes in employment, poorer educational performance and more multiple marriages (5).

There is a growing body of evidence indicating that young people with ADHD are more likely to engage in illegal and unsafe driving practices (6,7,8,9). This is a concern, given that young drivers in general are a high risk group, representing a major road safety and public health problem (10,11).

Considerable progress has been made in identifying effective treatment approaches for ADHD. The Australian National Health and Medical Research Council (2) recommends that treatment should be multimodal, drawing on the use of medication, behaviour management, family counselling and support and educational management. However, there is a major gap in the literature relating to programs/interventions specifically targeting the driving behaviour of people with ADHD. Consequently, this paper describes the development of such an intervention for young drivers. It is based on a synthesis of the available evidence relating to ADHD and driving, and an application of the 'best practice' features of more general strategies relating to the disorder, young driver safety and education, and community-based injury prevention.

DRIVING BEHAVIOURS ASSOCIATED WITH ADHD

While concerns about the driving behaviour of people with ADHD are not new, the issue has only recently attracted attention from researchers. Some of the first evidence to emerge came from a Canadian longitudinal study which found that adolescents and young adults with ADHD were more likely to be involved in road crashes as drivers, than control subjects (Weiss *et al*, 1979 cited in 7). Barkley *et al* (6) compared a group of teenagers and young adults (mainly male) who had been clinically diagnosed with ADHD in the United States with a 'normal' control group. Based on the reports of parents, the ADHD group subjects were more likely: to be involved in crashes (particularly more than one crash); to be at fault for these crashes and suffer resulting injuries; to commit traffic offences, particularly for speeding; and to have driven without a valid licence. Barkley *et al* (6) concluded: "*clinicians may need to counsel parents of adolescents with ADHD to ensure that the teenagers have received more extensive training in sound driving practices, that driving activities be monitored more closely, that use of a motor vehicle for joyriding be restricted, and that more serious ADHD cases be considered for treatment with stimulant medication for driving*" (p.219).

These findings were corroborated by Barkley *et al* (7) in a study that used both official motor vehicle records and data reported by the subjects and their parents. Compared with a control group, the official records showed that young adults with ADHD had committed more traffic offences, particularly speeding and were more likely to have had their licences suspended. While there was some official evidence that the ADHD group were more likely to be involved in crashes, the differences were not significant. The higher involvement of the ADHD subjects in crashes was more evident in the self-report data. In addition, the driving habits of the ADHD subjects were more likely to be rated as poor by themselves and their parents. The ADHD group also had more crashes, scrapes and erratic steering actions in a computer-simulated driving test than the control group.

A number of studies in other settings have produced similar findings. In a German study, Beck *et al* (8) found that subjects who were diagnosed with ADHD in childhood had a higher rate of involvement in road crashes, both before and after getting their licences, than a control group. Furthermore, those subjects reporting severe ADHD symptoms at the time of the study tended to be at an increased risk of causing crashes. However, the two groups did not differ in the number of traffic offences, alcohol consumption or attitudes to driving. Nada-raja *et al* (9) examined self-report and official traffic records of young people with ADHD within a cohort of New Zealand adolescents. They found that ADHD was strongly associated with traffic offences. In particular, they found a significant association between ADHD and traffic offences and crashes among females. This highlights the need to address the driving behaviour of females with ADHD, as well as males' (9). Murphy and Barkley (5) also found evidence of risky driving among a sample of adults with ADHD, compared with a comparison group.

Insights have also been obtained into the way that ADHD may affect the safety of drivers. Based on the results of a lengthy videotape test of their subjects' driving, Barkley *et al* (7) concluded that there was no significant difference between the ADHD drivers and the control group in terms of driver knowledge, vehicle operating procedures or emergency driving actions. "*Thus, it is in the actual performance of driving and in the exercising of sound driving habits, not in knowledge about driving, that drivers with ADHD seem to have their difficulties*" (7, p.1094). These results confirm extensive anecdotal evidence that the on-road problems of young drivers with ADHD relate to their impulsiveness and difficulties in anticipating the consequences of their actions and in discerning important information from the traffic environment (12).

Barkley *et al* (7) argue that interventions with ADHD drivers should focus on altering their motivation and self-discipline within natural settings and that “*any means of prompting or cueing and controlling the behaviour of these ADHD drivers while they are actually engaged in driving may be more effective than would simply a refresher course in driving skills*” (p.1095). This highlights the importance of the period when a young person is learning to drive, since they are accompanied by an experienced driver who can perform a mentoring role. Hence, with ADHD drivers, it would appear essential to maximise the benefits derived from this mentoring opportunity.

REVIEW OF RELEVANT INTERVENTION MODELS AND STRATEGIES

ADHD-specific interventions

Interventions for ADHD in Australia, the US and the UK historically have been limited by the decisions of Governments to exclude the disorder from eligibility for special needs funding, particularly in the case of education support funding. More recently, the NHMRC (2) has argued that doctors, educators, other relevant professionals and parents need to collaborate to optimally manage ADHD. Furthermore, they recommend that the effective management of ADHD requires the use of multimodal treatments and the development of specific and individualised management plans for children with ADHD and their families (2). Despite this focus on specific and individualised plans, a number of core principles underpin effective approaches to managing ADHD, including:

- the development and maintenance of positive self esteem;
- clear, consistent and sequentially structured instructions with integrated feedback;
- guidance towards self-management and self-efficacy;
- self-managed medication routines;
- realistic expectations with clear and immediate consequences; and
- escalation avoidance (1,4).

These core principles have a number of implications for improving driver education strategies. From a teaching and learning perspective, novice drivers with ADHD require clear instructions and immediate and specific feedback; the learning of new behaviours in small, well-planned steps; opportunities to achieve success; the frequent use of rewards; and extensive opportunities for practice. In terms of self-management, these drivers need to be encouraged to accept personal responsibility for their driving actions; to maintain their medication routines; and self-regulate their driving activity.

Novice driver education directions

Considerable attention has been given throughout the world to driver training/education measures designed to better prepare people for the driving task. Historically, the approach that has received the most attention from practitioners and researchers (particularly in the USA and Europe) is specialised or compulsory driver training. However, there is no clear evidence from Australia or elsewhere in the world that one method of pre-licence driver training produces safer drivers than other methods (13). Research points to the conclusion that driving is more than just a matter of developing knowledge and vehicle handling skills. Current approaches to novice driver training do not appear to adequately address the perceptual or cognitive skills required for safe driving, nor the motivational and attitudinal factors which can exert a powerful influence on driver judgement and decision-making (13,14,15).

Consequently, there is a need to examine ways of enhancing current driver education methods in order to improve their road safety impact. Based on a review of the literature, Watson *et al* (13) identified a number of promising directions including:

- developing improved driver education curricula and resources for use by both professional instructors and private tutors (*i.e.* family and friends of learners);
- enhancing the standard of professional driver training;
- encouraging closer co-operation between private tutors and professional instructors in cases where both are utilised by learner drivers;
- developing strategies to encourage learner drivers to obtain a greater amount and variety of practice prior to obtaining a licence (eg. utilising log books, encouraging parents to provide more opportunities for practice);

- encouraging the development and evaluation of innovative driver education programs and techniques which better target the wide range of factors that influence driver behaviour; and
- better linking driver training with the driver licensing system to minimise the risks faced by novice drivers without overly restricting their opportunities to obtain experience.

Many of these new directions are quite relevant to ADHD and driving. For example, the various behavioural and learning difficulties associated with ADHD suggest that this group would benefit from exposure to specialised training programs and greater opportunities to practice prior to licensing. While some of these needs can be met by professional instruction, benefits may be obtained by encouraging parents and/or friends to play an active, 'mentoring' role in the learning process.

Community-based injury prevention strategies

There is growing international and national recognition that the involvement of individuals, communities and organisations is required to effectively implement best practice solutions to injury prevention (16). Contemporary models of community development reflect a shift in philosophy from centrally determined structure and delivery to consultative development based on local resources and expertise (17). Local agency impact is increasingly acknowledged as significant in achieving project outcomes, while community networks are becoming valued over bureaucratic structures (18). Encouraging results are emerging from community-based approaches to road safety conducted both overseas and in Australia (13). Promoting the involvement of the community in road safety is also a key action within the Queensland Road Safety (19). Hence, it would be highly valuable to harness local community support for the development of an intervention targeting drivers with ADHD. This will enhance the likely relevance, impact and sustainability of the project.

PROPOSED INTERVENTION MODEL

Intervention components

Based on the evidence presented above, the primary aim of the intervention is to enhance the impulse control, attention, judgement and decision-making of the target group. It is proposed that the intervention will feature three components: psychological counselling; specialised driver training; and a mentoring program for use by parents and/or other people involved in teaching learner drivers with ADHD. The title of the project reflects the behavioural objective of the intervention: Motor SMART (Motor Sensory Mapping and Response Training).

- *Psychological counselling*

This component will be conducted by a registered psychologist with demonstrated expertise in working with young people with ADHD. It will focus on promoting self-esteem, confidence and sound decision-making among the target group, while examining their general perceptions and attitudes towards driving. While the style of counselling will be at the professional discretion of the psychologist, the discussion topics will be agreed between the psychologist and the Project Reference Group. A group of Critical Friends (eminent specialists in ADHD) will assist with the development of the counselling component and the selection of the psychologist. Initial discussions have suggested that the counselling will be conducted in small groups (most likely four participants). This will promote peer dialogue, analytical discussion and sustained participant involvement while facilitating the joint delivery of the counselling and the specialised driver training, discussed below.

- *Specialised driver training*

The specialised driving instruction will be conducted at an off-road driver training facility. It will be delivered by an organisation with experience in operating courses for novice drivers with special needs. The course will be tailored to meet the needs of the target group, drawing on the evidence relating to ADHD behaviour management and teaching strategies discussed above. The focus of the course will be on developing hazard recognition, risk assessment and decision-making skills, rather than crash avoidance skills. The specific content of the course will be developed by the training provider in conjunction with the Project Reference Group. The target group will undertake the training in multiple groups of four participants. It is anticipated that the driver training and psychological counselling will be conducted jointly in a two-day/one-night block session.

- *Mentoring program*

Mentors will receive information on appropriate strategies for supervising learner drivers, with special reference to the needs of drivers with ADHD. It is envisaged that this information will be presented in a manual that will act as a reference for both the mentors and the young drivers. The manual will also include a logbook where the types of learning experiences can be recorded, in order to encourage a wide variety of practice to be undertaken. The information in the manual will reinforce the techniques and messages covered in the specialised driver training course. A key role of the mentors is to cue, prompt and reinforce appropriate behaviours and moderate instances of poor impulse control and attention. Consideration is being given to the need for the mentor and the young driver to enter into a formal agreement, incorporating a code of conduct, and the value of establishing a telephone help-line for the mentors.

Involvement of the local community and ADHD experts

The initial impetus for this project arose out of the concerns of a local community support group for parents with ADHD children. Many of these parents were concerned about the problems that would arise as their children approached the age for obtaining a driver's licence. This support group acted as the principal body, through which the project grant application was made and has been included on a Project Reference Group, established to inform and monitor the project. Other members of the Project Reference Group include professionals with expertise in ADHD, driver education, road safety and project management, as well as representatives from various Local Government agencies. A broader group of Critical Friends, comprising experts in the field of ADHD research and management, advises the Project Reference Group. Together, these two groups have provided a structure for the project that balances local community knowledge and involvement with expertise in the areas of ADHD and road safety.

Proposed evaluation strategy

The intervention will be conducted on Queensland's Sunshine Coast, which covers three local government areas of mixed metropolitan and semi-rural populations. Although the evaluation methodology is still to be finalised, the outcomes of interest will include the subsequent on-road behaviour of subjects and their official traffic offence and road crash experience. The evaluation will involve a comparison of three groups:

- a group of approximately 50 young people who are diagnosed as having ADHD, according to DSM IV (20), and have already obtained a Learner's Permit who will be exposed to the full intervention;
- a similar group who will be exposed to a cut-down version of the intervention, featuring only the mentoring component; and
- an historical control group who were diagnosed as having ADHD at the time they started learning to drive and who have subsequently accumulated at least three years of driving experience.

The subjects in all three groups will be recruited via the local ADHD support group. Those in the two experimental groups will be randomly assigned to their respective groups, according to the school they attend. All three groups will be matched as closely as possible within the constraints of the design. It should be noted, that the decision to use an historical control group was prompted by the concerns of the local ADHD support group who were reluctant to withhold the intervention from potential subjects. Pre and post intervention data will be collected from the subjects (and their parents), relating to both general and on-road driving behaviour, including: medication use; attitudes and perceptions toward driving and traffic law enforcement; amount and range of driving practice undertaken; road use patterns; and self-reported crash and offence involvement. Similar data will be collected from the historical control group relating to past driving experiences. The crash and traffic offence histories of all three groups will also be compared, using official driver licensing and road crash records.

CONCLUSION

The need for the current project was identified by the parents of children with ADHD and accorded with the emerging body of evidence confirming the risks that are faced by drivers with this disorder. In the absence of a suitable model, the project team has had to develop an intervention based on a synthesis of the available evidence relating to ADHD, young driver safety and education and community-based injury reduction. The management structure for the project has been designed to maintain a strong involvement from the local community, while harnessing the assistance of relevant experts. Besides the outcome evaluation that will be

conducted, important process information will be obtained about implementing a specialised driver education project within a community setting.

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