

# Evaluation of wells attention training technique



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An attention training technique has previously been shown to reduce symptoms of anxiety and depression amongst otherwise healthy individuals. The proposed study will use a multiple baseline design to investigate whether these benefits are replicated when the attention training technique is used with people with acquired brain injury. The study will also investigate whether participants demonstrate neuropsychological improvements in cognition after completing the programme of attention training.

## **Introduction**

Wells Attention Training reduced self focussed attention

Ruminative thinking is thought to be a significant factor in the maintenance of mental health problems such as depression (Watkins & Teasdale, 2001) anxiety (Segerstrom, et al., 2000) and post traumatic stress disorder (Michael et al., 2007).

Wells' Attention Training Technique (ATT) is demonstrated to reduce perseverative rumination and self focussed thinking in a population of people with mental health problems such as anxiety (Wells, 1990), social phobia (Wells White & Carter, 1997) and recurrent major depression (Papageorgiou & Wells, 2000). The benefits of this attention training intervention have been maintained at follow up after 6 and 12 months. However, the mechanism of action of this intervention continues to be debated. It is proposed that the intervention breaks perseverative thinking and increases flexible control of attention, to bring about increased control of the attention-cognition system (Wells, White & Carter, 1997).

The ATT intervention is developed on the basis of Wells' S-REF model. The S-REF model predicts that people have difficulty interrupting their self-focussed ruminative thinking processes and therefore their available attentional capacity is reduced. In people with mood disorder, this is suggested as a mechanism for reduced cognitive capacity with which to process information in the environment that disconfirms negative predictions. Reduced capacity to process new information is proposed to maintain the mood disorder.

Wells (1990) proposes that training in skills to increase the executive control of attention will enable participants to shift their thinking and thereby disrupt the ruminative process. The ATT intervention, based upon this S-REF model, is proposed by Wells and Matthews (1994). They describe an auditory attention manipulation that they argue modifies 3 conceptually distinct dimensions of attention:

Intensity of self focus

Attentional control

Breadth of attention (to reduce narrowing of focus)

The training sessions consist of training in selective, rapid switching and divided attention. The exercise must be practiced twice a day as homework and in treatment sessions. When used in conjunction with cognitive therapy for emotional disorders, it has been shown to have beneficial effects. They propose that the effectiveness of the intervention is through increased awareness of mental processes which enables people to shift their attention

away from ruminative thinking, thereby, reducing depressive relapse (Watkins & Baracaia, 2002).

Williams (2006) suggests overlapping concepts between aspects of the S-REF model, targeted in ATT, and the Supervisory Attention System of executive functioning. A perseverative processing pattern is arguably a temporary perseveration in 'contention scheduling', which requires interventions to disrupt the process and shift attentional focus. Therefore, one mechanism of action of ATT is through improving attentional switching.

### Acquired brain injury

The incidence of anxiety and depression is increased after acquired brain injury (Jorge & Robinson, 2002). Mental health problems after acquired brain injury, including depression and anxiety, are among the most significant predictors of psychosocial outcome (Draper, Ponsford, & Schonberger, 2007). Concurrently, people with brain injury frequently experience functional difficulties with attention, such as reduced ability to concentrate or increased vulnerability to distraction. Sohlberg and Mateer (2000) propose an attention training package (Attention Process Training, APT) for people with acquired brain injury. The package has been evaluated and improvements were demonstrated on neuropsychological assessments of attention including switching attention. However, in a recent review, it was concluded that there is a need for further research to clarify the differential effects of different interventions for attention (Cicerone et al., 2005).

To date, ATT has not been systematically evaluated with people with acquired brain injury and mood or attentional problems. However, it has <https://assignbuster.com/evaluation-of-wells-attention-training-technique/>

been applied clinically to select individual cases who report interacting mood and cognitive problems. Positive outcomes are reported by the individual clients, and improvements are demonstrated on baseline measures of attention switching speed or duration of sustaining attention without a slip (Yeates, 2008). Therefore, the potential neuropsychological and mental health benefits of ATT for a brain injury population are suggested in individual case studies, but have not yet been evaluated systematically.

Given the conceptual parity between APT and ATT, parallels may be drawn between them. Both APT and ATT are attention training programmes that demonstrate improvements for attentional switching. However, the impact of APT on emotional processing has not been assessed and similarly, the neuropsychological impact of ATT has not been measured. If there were an intervention that could be administered routinely in rehabilitation with demonstrable benefits both for mood and cognition, this would be of great significance for planning of rehabilitation efforts.

#### Integration of cognition and emotion

In rehabilitation, clients often present with concurrent attentional impairments and mood disorder. The overlap between cognitive models of affect and neuropsychological models has not been sufficiently explored so as to enable the clinician to offer clients an evidence based intervention for attention impairments where the client has interacting impairments of emotion and cognition. ATT has not been evaluated for its neuropsychological implications and nor has APT been evaluated for influence on processing of emotion and rumination.

ATT can be understood from the perspective of the S-REF model or from a model of executive control, such as the SAS. It is possible that the mechanism of action for the beneficial influence on mood is the same mechanism through which it has a beneficial influence on executive control of attention and more broadly upon neuropsychological functioning; participants will become more aware of their information processing and will report greater control over the focus and shifting of their attention. The distinction between cognitive intervention and mood intervention may be in the introduction to the training provided by the clinician.

During evaluation of APT, the programme ran for 10 weeks and neuropsychological improvements were demonstrated after this time (Sohlber & Mateer, 2000). The ATT intervention continues with daily practice until the individual rates their attentional self focus as equal to or less than 1/7. This has previously been achieved during a 2 week intervention (Wells, 1990).

This study will evaluate the application of Well's attention training technique with a population of people with acquired brain injury. If improvements are demonstrated in attentional self focus, of parity to when the intervention is applied to a non brain injured mental health population, then this study will extend exploration to include the neuropsychological impact of Wells attention training using post hoc analyses. In order that the intervention continues for sufficient period of time to allow neuropsychological change, the intervention will run over 10 weeks.

Single case experimental design

The ideal experimental design, in terms of rigour and control, is the randomised control trial. However, there are occasions when such a design is not feasible. For example, when the research population is limited, or where a novel intervention is being explored. An alternative research design is the single case experimental design. Such a design offers the strength of looking in detail at the presentation of an individual participant, and their idiosyncratic responses to the intervention. In the case of this research study, if one were to investigate whether Wells' attention training technique both reduces ruminative self focus and enhances attentional performance in functional situations when applied to individuals with brain injury, the participants would be required to demonstrate a deficit of attention, in addition to a self reported difficulty with ruminative thinking. The potential number of participants available for this study would be limited, and therefore this is an occasion when single case experimental design would be appropriate.

Further, although the intervention has been evaluated with individuals without brain injury, this study will be applying a novel intervention for people with brain injury. A strength of the single case experimental design is that it enables the researchers to mimic clinical practice, and account for individual differences in presentation. Therefore, it is hoped that findings will be generative to clinical practice, and that potential benefits for participants will extend into their day to day lives.

If the single case experimental design incorporates multiple baseline measurements, such a design would increase control of practice effects and non-intervention related factors. The power of a multiple baseline design is <https://assignbuster.com/evaluation-of-wells-attention-training-technique/>

further increased when the design is replicated across several participants, and providing that the length of baseline is randomised for each participant it is possible to perform statistical analysis of changes measured before and after intervention (Todman, 2001). The strength of the multiple baseline design is that any existing practice effects of repeated cognitive assessments, or changes due to factors not related to the intervention, will be highlighted and considered in the analysis.

## **Aims and hypotheses**

### Aims:

The primary aim of this study is to evaluate the effectiveness of Wells' Attention Training Technique (Wells, 1990) in reducing self focused attention, when applied to a brain injury population. The secondary aim of the study is to evaluate impact of Wells' Attention Training Technique on awareness of attention slips, neuropsychological correlates of attention and number of attention slips during day-to-day tasks.

### Hypotheses:

Following Wells' Attention Training intervention, improvements will be demonstrated in self ratings of the following 3 areas of attention:

Intensity of self focus

Attentional control

Breadth of attention (to reduce narrowing of focus)



Given the conceptual parity between ATT and APT, neuropsychological improvements will be demonstrated (in testing and functional measures) following the attention training intervention

## **Plan of Investigation**

### Participants

Total number of participants will equal 5 to ensure the intervention is replicated on a number of different individuals.

Inclusion criteria are:

Aged between 18 and 60

greater than 1 year post injury

acquired brain injury

exhibiting functional attention deficits (in response to screening question)

reporting ruminative self-focussed thinking (in response to screening question)

neuropsychological deficit in attention (confirmed by below average performance on ' Elevator Counting with Distraction' subtest of the Test of Everyday Attention)

Exclusion criteria are:

Pre injury history of neurological condition, psychiatric disorder or learning disability

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## Recruitment

Participants will be recruited via the Rehabilitation Assessment process at the Oliver Zangwill Centre. Participants who attend the preliminary (1 day) or detailed assessment (8 day) processes between September and October 2008 will be screened for suitability for the study. If the client satisfies the inclusion criteria, they will be given the information sheet about the study and invited to participate.

## Screen

A brief screen will be used to identify potential participants, as part of the routine assessment.

Do you find you become more pre-occupied by/ lost in your own thoughts since your brain injury? (yes/ no)

Do you have any difficulties with attention or concentration since your brain injury? (yes/ no)

Question to carer or relative: does your client/ relative have problems with attention or concentration since their brain injury? (yes/no)

Neuropsychological deficit in attention present, as demonstrated by performance below the average range on the Elevator counting with distraction (TEA)

This specific subtest of the TEA has been selected as it is routinely administered as a part of the standard assessment battery and therefore the screening assessments will form part of routine clinical practice. Further, this <https://assignbuster.com/evaluation-of-wells-attention-training-technique/>

measure has proven sensitive to problems with attention switching. A selection of previous clients at the Centre have reported self-focussed rumination and low mood, and these people have also performed below average on this assessment.

## Measures

### Pre-post measures

Neuropsychological assessments will be used at the end of the baseline period, and after the intervention. The selected neuropsychological assessments (see Table 1) address the areas of cognition where an effect of APT was previously demonstrated. The measures are selected order to ascertain whether the ATT intervention has the same neuropsychological impact as APT

The sustained attention to response task (SART) has been selected as an assessment of vigilance because this is a measure of sustained attention that does not usually demonstrate ceiling effects in a TBI population. The task requires the participant to be actively attending to the task for the entire time in order to avoid errors (Tom Manly, personal communication, 2008).

### TABLE 1: Pre-post intervention measures

## **Measure**

### **Predicted change**

### **Rationale**

Sustained attention to response task (SART; Manly et al., 2003)

Improvement

Recommended, as vigilance could be a medicating factor in the impact of attention training interventions (Sohlberg & Mateer, 2000)

This test will not be repeated at the end of the study.

Paced Auditory Serial Addition Test, 50 items (PASAT 50; Gronwall, 1977; Diehr et al., 2003)

Improvement

The PASAT demonstrated improvements after APT.

'Color word interference test' subtest from the Delis-Kaplan Executive Function System (D-KEFS; Delis, Kaplan & Kramer, 2001)

Improvement

The Stroop demonstrated improvements after APT (Sohlberg & Mateer, 2000). The D-KEFs color word inference test will be used in place of the stroop because the norms are more recent.

'TRAILS' subtest from the D-KEFS (Delis, Kaplan & Kramer, 2001)

Improvement

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Participants would be expected to demonstrate improvement on this assessment of switching, which incorporates attention and executive processes

The Hospital Anxiety And Depression Scale (HADS; Zigmond & Snaith, 1983)

Decreased total score

Ruminative thinking has a global impact on mood and therefore lower levels of symptoms of anxiety and depression would be predicted.

DiVA questionnaire from the Test of Divided Attention

(DiVA; Wilson et al., 2005)

Decreased total score indicates improvement in dual tasking ability

ATT is argued to increase breadth of attentional focus, which is likely to be seen demonstrated through improved ability to dual task.

Repeated measures

A number of self ratings will be repeated throughout the study. These are outlined in Table 2 with a description of the procedure for how the data will be gathered.

TABLE 2: Summary of measures that will be repeated throughout the study with each participant.

## **Measure**

### **Description**

### **Rationale and predicted change point**

### **Frequency**

Functional slips

Number of self-rated slips recorded during personally relevant functional task that happens at least x1 per week

If it is possible to also ascertain an observer rating on specified errors on a specified task this will also be collected and analysed separately.

Time to first slip on functional task

This score will change after week 9 of intervention phase

3 x per week (minimum)

‘ Functional Slips’ procedure

Clients will be asked to identify a day to day task in which they experience difficulties with attention (e. g. ability to concentrate on reading, follow the plot of a TV programme or listening to a conversation). They will count number of times their attention ‘ slips’ (goes off topic) during a set amount of time on the task (e. g. 30 minutes) on 3 different pre-planned occasions during the week. In session, the time elapsed between task start point and first attentional slip will be recorded.

Beliefs about control of attention

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Self rating from 0-10/10 of:

“ I am able to control where my attention focuses” (taken from the Generalised Anxiety Disorder Scale Wells, 2002)

Self focus intensity rating before and after training (using visual analogue scale 0; completely self focused and 10; equally aware of self and environment).

Rating of ability to focus on more than one stimulus at the same time (taken from the Test of Divided Attention(DiVA; Wilson et al., 2005)

These scores are predicted to change between weeks 1 and 4

& 3:

3x per week

Every day (after practicing ATT)

‘ Beliefs’ procedure

At the beginning of each session, participants will be asked to rate their ability to control their attention, and their ability to focus on more than one stimulus at a time. They will be asked to rate this on 2 other pre-planned occasions during the week. At the beginning and end of each session, the participant will also be asked to rate the intensity with which they are focussed on themselves. They will be asked to do this after each practice session during the week.

Awareness of attention

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Visual analogue scale of 10 points will use the following anchor points

0; " I am aware of when I lose my concentration, or attention on task", 10;

And " I am not aware of when I lose my concentration, or attention on task"

This score is likely to change during baseline.

Score predicted to

change between baseline and week 4

3 x per week

' Awareness' procedure

The participants will be asked to rate their awareness of when they lose their attention on a scale of 0-10. They will be asked to rate this on 2 other pre-planned occasions during the week

Subjective consequences of attention problems

Occurrence of personally significant consequences of attention problems as rated on personal rating scales (0-10) defined pre intervention with the participant.

Predicted to change during situations training (weeks 7-8)

3 x per week

' Subjective experiences' procedure



Participants will be interviewed prior to the beginning of the intervention.

This interview will clarify the personal experience of attention difficulties, and identify 3 areas in which the individual would like to see change. These items will be transposed into rating scales that the participant will use to rate the occurrence of these problems on 2 pre planned occasions during the week.

## **Design and Procedures**

### Design Rationale

This study will incorporate an AB (2 phase; baseline and ATT intervention) multiple baseline design across five subjects. The range of baseline measures will be taken throughout phases A and B, and are hypothesised to change at different points during the ATT intervention, as described below. It is not possible to return to baseline after the ATT intervention and therefore the multiple baseline design was preferred over an ABA design. The A phase (baseline) will incorporate a minimum of 6 observation points (collected at 3 observation points per week per participant). Owing to the control inbuilt within the multiple baseline design, it will not be necessary to incorporate an additional control variable.

### Design Summary

5 participants will be recruited to the study. Baseline assessments will be measured (SART, TEA, HADS, DiVA, color-word interference test, Trails test).

Data will be collected on a minimum of 6 occasions and a maximum of 15 occasions (3 times per week) regarding each participant's self rating of their

beliefs about attention, awareness of attention, subjective report of problems caused by attention ‘slips’.

Additionally, data will be collected on a minimum of 6 occasions and a maximum of 15 occasions (3 times per week) about number of observed attention slips as noted by the participant.

Length of baseline will be selected using restricted randomisation test (minimum 6 and maximum 15)

Intervention phase will be conducted in the same way for each participant, as described below.

At the end of intervention phase, the original assessments will be re-administered, using parallel forms where available (SART, TEA, HADS, DiVA, color-word interference test, Trails test).

All repeated variables will be measured at three points during each week. Length of baseline for each participant individually will be determined by restricted randomisation test (Todman, 2001). In keeping with the requirements of the randomisation test, all participants will have the same number of observation/ data points (maximum 42).

The limits of the data will therefore be: participants (5), total observation points (42), minimum observation points in baseline phase (6) and minimum observation points during entire treatment phase (30). Participants will be randomly assigned an intervention phase start point between observation point 7 and observation point 16 using Microsoft Excel random number generation formula.

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## Intervention Phase procedures

During intervention, observations and recordings will continue as in the baseline phase.

Intervention phase of attention training will take place over a period of 10 weeks, an equivalent time period to that used in the evaluation of APT. See Table 3 for details of the protocol for each week of the attention training intervention. In keeping with the hypotheses outlined above, the direction of changes predicted on measures is illustrated in Table 4.

Table 3: Intervention Planning

## **Week of intervention (B) phase**

### **Session content**

#### **Between session activity**

1 & 2

Goals, monitoring and education

Question: How helpful do you think this will be? (0-100)

Education about neuropsychological aspects of attention control.

Introduction attention beam and rationale for intervention (commence ATT)

Measure time to first attention slip on participant's selected task (tv programme, reading or radio programme)

Practice ATT 2x per day for 10-15 minutes

3 & 4

Continue ATT

(external sounds)

Audio recording of sounds used to practice switching using 2, 3 and 4 sounds plus external sounds, following script from Adrian Wells

Practice ATT 2x per day for 10-15 minutes

5 & 6

ATT (with internal distractions)

Switching between sounds on the audio recording and internal/ bodily events such as 1 the feeling of self on chair, 2 the feeling of toes in shoes, 3 the feeling of breathing, 4 the thoughts passing through my mind

Practice beam for internal events, thoughts etc

7 & 8

Situational training (self focus)

Applying switching strategy from weeks 3-6 to personally meaningful situations i. e. noticing when one is self focussed or at risk of becoming unhelpfully self focussed and using the switching strategies to change focus to external events including visual and auditory external focus.

Practice SAR

9 & 10

Situational training (day to day slips)

Applying switching strategy from weeks 3-6 to functional situations (e. g. watching tv, reading a book, cooking a meal) and measuring length of time to first slip aiming to lengthen time to first slip.

Practice functional task

11

Repeat pre post measures

The design of this investigation meets the criteria for high quality single case experimental designs set out by Tate et al., (2008) as detailed in the appendix.

Table 4: Predicted changes on measures throughout the intervention phase

## **Measure**

Functional slips

\*

Subjective consequences of slips

\*

Beliefs about attention control

\*

\*

Awareness of attention

\*

\*

\*

## **Phase**

Baseline

Goals, monitoring & education

ATT (external sounds)

ATT

(internal distractions)

Situational training: self focus

Situational training: day to day slips

## **Week**

Length to be confirmed

**1-2**

**3-4**

**5-6**

**7-8**

**9-10**

Symbol for predicted change = \*

## **Settings and Equipment**

To conduct this study, the researcher requires access to the following equipment:

Assessment tools: SART, PASAT, D-KEFs (color word interference test and Trails subtest), DiVA questionnaire, GADS questionnaire, HADS questionnaire.

In order to measure time to first slip, and to develop rating scales with the participants, the researcher requires a stopwatch, pens, pencils and paper.

Data will be entered into an SPSS (version 12) spreadsheet

## **Data Analysis and Power Calculations**

Pre-Post Measures

To establish whether a reliable change is demonstrated (from neuropsychological assessment) for each individual pre and post intervention, the results will be entered into a regression equation as described by Crawford & Garthwaite (2006). It will not be possible to conduct group comparisons owing to the small number of participants in the study.

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## Repeated Measures

Interpretation of impact of intervention on repeated measures will first be analysed by visual inspection. Secondary analysis, to ascertain whether there are statistically significant differences between phase A and phase B data, will be conducted using a randomisation test (Todman, 2001) for each variable's data set. The study hypothesises that change will occur at different time points according to the intervention stage (for example, beliefs about control of attention are predicted to change during weeks 1-4, whereas functional attention slips are predicted to change after week 9). The predicted change points are defined in Table 2. Therefore, the identified intervention onset point will be different for each measure, consistent with the earliest point at which change would be predicted on that measure.

In addition, an exact probability test (Todman, 2001) will be conducted for each repeated variable (see Table 2) to ascertain the likelihood of any found differences in the recorded data before named intervention start point.

## Power Calculation

Using this design, there will be 7 possible intervention points therefore with 5 participants, there will be  $7^5 = 16807$  possible arrangements of the data, therefore the lowest possible p value will be  $1/16807 = 0.0000595$ . If only 4 participants are used in the study then there will be  $7^4 = 2401$  possible arrangements and therefore the lowest possible p value would be  $1/2401 = 0.000416$  and if only 3 participants were used in the study, there will be  $7^3 = 343$  possible arrangements of the data, and therefore the lowest p value would be  $p = 0.00291$

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## **Practical Application**

### Timescale

Invite participants (send letters) at end November 2008

Submit literature review 19 December

Begin data collection 6 January 2009 (baseline plus intervention time will be a maximum 14 weeks)

Submit introduction 27 March 2009

Submit Method section 30 April 2009

Submit results 30 May 2009

Final submission August 31 2009

### Ethical issues and approval process

All of the participants will be receiving a potentially beneficial intervention. However, participation in the research project will require a substantial time commitment to the investigation (once a week for approximately 12 weeks). This will be outlined to participants in the information sheet and will be discussed fully with the participant before they commit to the study and sign the consent form. Participants will also be supported to plan and organise themselves in making the weekly appointments, as the researchers have an appreciation of the impact of attention on memory, and on planning ability. Therefore, researchers will write down the appointment times down for the

participant and endeavour to hold appointments at the same time each week (where possible for the participant and researcher).

Occasionally assessment of cognitive functioning can provoke emotion in the person being assessed. The results of the assessments will be explained to the participant and a relative or carer (should the participant request this).

The study is not designed to induce ruminative thinking in participants.

Participants will only be advised how the technique can be applied to rumination and will not be asked to practice this in sessions. However, if appropriate, participants will be offered an opportunity to discuss their emotional reactions in a non-research context. Participants who express distress, and who consent, can be referred to or advised about appropriate services, or advised to discuss further with their GP.

Finally, the secure management of data will be ensured by the following steps:

- (a) Participant information will be stored in a locked filing cabinet
- (b) Computer-based information will be saved using an encrypted format
- (c) Data will be fully anonymised prior to any communications outside of the research team, should it be requested for audit or for the purposes of reporting the study.

Cambridge REC meets as below. Proposed submission for meeting on 26 September (cut off date 8 September).

## **Name of Committees**

## **Categories**

## **Meeting Date**

## **Cut-off Date**

Cambridgeshire 1 Research Ethics Committee

“ 3” D & HTB

21 October 2008

06 October 2008

Cambridgeshire 2 Research Ethics Committee

“ 2” D, C & HTB

24 October 2008

06 October 2008

Cambridgeshire 3 Research Ethics Committee

“ A” ALC

02 October 2008

17 September 2008

Cambridgeshire 4 Research Ethics Committee

“ 3”

23 October 2008

07 October 2008

Appropriate ethics committee will be one of the 4 Cambridgeshire RECs (as above