



## Cognitive-behavioural training to change attributional style improves employee well-being, job satisfaction, productivity, and turnover

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### ABSTRACT

We report, for the first time in the literature, a cognitive-behavioural training waiting-list controlled study that changed employees' attributional style, reduced turnover, increased productivity, and improved a number of individual differences measures of well-being. One hundred and sixty-six financial services sales agents (98% male, mean age  $36.2 \pm 9$  years) were randomly assigned to either (a) a seven-week cognitive-behavioural training program or (b) a waiting-list.

Significant improvements resulted in employees' attributional style, job satisfaction, self-esteem, psychological well-being and general productivity. A significant reduction in employee turnover over a 4.5 month period was observed. The waiting-list control group replicated these results when they subsequently went through the same program. These findings demonstrate that work-related attitudes and behaviours, especially in motivationally challenging occupations, can be changed with cognitive-behavioural training to improve attributional style. The study is also valuable for personality and individual differences research because it shows how psychological variables can be changed by effective intervention in applied settings.

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### 1. Introduction

Factors affecting workplace well-being are a concern for organizations and national economies. An intervention based on sound psychological principles and shown to improve employee well-being and productivity would be of considerable value. Here we report, for the first time in the literature, a cognitive-behavioural training waiting-list controlled study which reduced employee turnover, increased productivity, and improved a number of individual differences measures of well-being. This study is important for personality and individual differences research because it demonstrates the impact of effective interventions in applied settings and fulfills Cronbach's (1957) and Eysenck's (1997) call for a unification of experimental and individual differences research approaches (see Corr, 2007).

Employee turnover is a significant problem for many organizations. In the UK financial services industry, turnover among sales people has exceeded 40% annually with similar figures reported in the USA. High turnover rates also occur in commercial, governmental and military sectors, especially those where change is prevalent. Quitting has financial and psychological consequences for

those who leave and, for those who remain there is often additional work pressure and unsettled work practices. The cost of replacing sales staff (recruitment, training, and business lost) is high, yet very few organizations have systematic policies and procedures to control turnover. One reason is the shortage of empirically-validated strategies. Generally, research has focused on constructing and testing theoretical models of the turnover process involving employee attributes such as commitment, job satisfaction, tenure and job withdrawal cognitions (Hom, Robertson, & Ellis, 2008; Huang, Lawler, & Lei, 2007). The few documented attempts to reduce employee turnover have focused on selection procedures (Phillips, 1998), work re-design (Glassop, 2002) or large-scale organizational interventions (Glisson, Dukes, & Green, 2006). Training programs have been scarce and of limited effect (Pazy, Ganzach, & Davidov, 2006; Waung, 1995).

In this paper, we report the impact on employee well-being, job satisfaction, productivity and turnover of a training program based on principles of cognitive-behavioural therapy (CBT). The program was designed to help employees evaluate and, where indicated, change their work-related thoughts, attitudes and behaviours, and specifically to assess the accuracy and functionality of attributions they made for work-related events.

Attributional style is the characteristic way people attribute causes to events, particularly successes and failures. When nega-

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tive events are consistently attributed to internal, stable and global factors, and positive events to external, temporary and specific causes, even in the face of contrary evidence (a 'pessimistic attributional style'), hopelessness and giving up tends to result when failure, stress, rejection and other negative events are encountered (Abramson, Seligman, & Teasdale 1978; Alloy, Abramson, Metalsky, & Hartlage, 1988). The workplace equivalent of hopelessness and giving up is presenteeism, absenteeism, withdrawal cognitions and actual quitting. A study of 103 newly-appointed insurance sales agents demonstrated that those with an optimistic attributional style remained in their job at twice the rate and sold more insurance than those with a pessimistic attributional style (Seligman & Schulman, 1986). Optimistic attributional style correlates significantly with job satisfaction and performance (Corr & Gray, 1995, 1996). Yet, to our knowledge, there have been no organizational interventions to help employees evaluate the veridicality and functionality of the attributions they make for work-related events.

CBT modifies attributional style (Seligman et al., 1988), and is efficacious in the treatment of a variety of psychological disorders (Leahy, 2004), but its application to work-related issues has been limited. Proudfoot, Guest, Carson, Dunn and Gray (1997) demonstrated that a cognitive-behavioural intervention was associated with significant gains in well-being and job-finding among long-term unemployed people, and Ruwaard, Lange, Bouwman, Broeksteeg, and Schrieken (2007) showed that a cognitive-behavioural program conducted via email brought about improvements in employees' anxiety and stress. However, there have not been any direct attempts to apply cognitive-behavioural techniques to work variables.

In this study, we hypothesized that a training program based on CBT principles and aimed at changing employees' work-related attributional style, would improve work self-esteem, job satisfaction, psychological well-being, productivity and turnover. We evaluated the program in a high-turnover occupation: insurance selling.

## 2. Methods

### 2.1. The training program

The program consisted of seven weekly sessions, 3 h per week (Table 1), a 6-week maintenance program at work, and a review

**Table 1**  
Schedule of attributional training program

Length	21 h
Structure	7 × 3-h sessions, one per week Assignments between sessions to promote experimentation with, and application of, strategies
Session content	
1	Introduction to cognitive model
2	Automatic thoughts, goal-setting, time management, task breakdown
3	Thought recording, thinking errors, activity scheduling
4	Changing unhelpful thinking
5	Accessing deeper beliefs, attributions
6	Attributional dimensions
7	Integration of strategies, action planning, relapse prevention
Training techniques	Socratic questioning, group discussions, self-observation, experimentation, individual and syndicate activities, assignments
Session format	Review of previous session Debrief assignments Introduce session topic(s) Individual and syndicate activities Feedback, discussion, reflection Outline weekly assignment Session summary Survey delegates' response to the session

session 3 months after the conclusion of the training. The program was written to conform to the average length of CBT, and consistent with adult learning procedures, it was conducted over a number of sessions to allow the skills to be practised at work between the sessions and consolidated. The program was designed on the CBT manual (Beck, Rush, Shaw, & Emery, 1979) and organizational training principles. It was inspired by a one-day course written by Martin Seligman and his colleagues, which they made available to us for pilot studies, and which was substantially modified and extended by the first author to form the 13-week (7 weeks training, 6 weeks maintenance) program.

### 2.2. Design

A waiting-list control group design was employed. Participants randomly allocated to the waiting-listed group received the attributional training program after the completion of 3-month follow-up (Fig. 1). Ethics approval for the study was granted by the Institute of Psychiatry Human Ethics Committee, and participants gave informed written consent.

### 2.3. Participants

Participants were recruited from a major British insurance company which had recently been acquired by a competitive, results-oriented organisation. Large-scale changes had been imposed and substantial numbers of employees were quitting. Sales agents from four Divisions in South-East England were invited to attend the program, particularly those deemed by their managers or themselves to be experiencing stress in their jobs.

Power calculations, based on independent *t*-tests of pre-post change scores between groups in a previous study (Proudfoot, 1996), showed that to detect a difference of 0.5 standard deviation at 80% power and with a 0.05 $\alpha$ , 64 participants were needed in each condition.

One hundred and sixty-six employees took part in the study. They were randomly assigned to the 'initial' training group ( $n = 81$ , mean age 36.2  $\pm$  9 years, 98% male, mean years in job 6.6  $\pm$  6.7), or to the waiting-listed control group ( $n = 81$ , mean age 36.2  $\pm$  9 years, 98% male, mean years in job 6.6  $\pm$  6.7). Seventy one percent reported experiencing work-related stress in the three months prior to the study and performing poorly (that is, not reaching their sales or earnings targets).

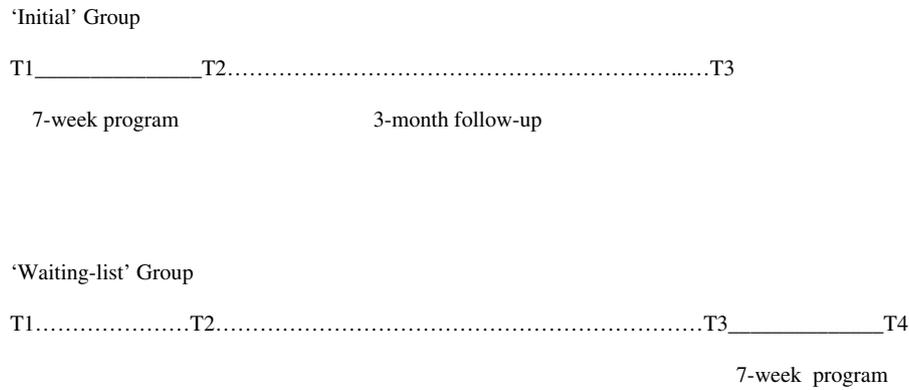
Twelve courses were conducted: six for the 81 sales agents randomly allocated to the initial courses, and six courses, 5 months later, for the remaining 75 in the waiting-listed group. (By the time the courses commenced for the waiting-list control group, the initial sample of 85 was reduced to 75.)

### 2.4. Outcomes

#### 2.4.1. Psychological outcomes

Participants completed psychological questionnaires prior to their course, at its end, 3 months later to test for maintenance of effect and to provide a baseline for the waiting-list control courses (post-test 2); and at the end of the second series of courses (post-test 3) (see Fig. 1). The following measures were used.

**2.4.1.1. Attributional style.** The financial services attributional style questionnaire (FSASQ; Proudfoot, Corr, Guest, & Gray, 2001) is a domain-specific version of the attributional style questionnaire (ASQ; Peterson et al., 1982), which provides eight positive and eight negative hypothetical situations for which the respondent supplies causes and then rates each cause along dimensions of locus, permanence and pervasiveness. Scores range from 0 to 21, with a strong attributional style indicated by a high composite



**Fig. 1.** Research design, showing 'initial' training group sessions, 3 months interval, training courses for waiting-list group (five months later) and measurement points: T1 = before training; T2 = after training; T3 = 3 month follow-up (also baseline for waiting-list group); and T4 = after training for waiting-list group. Solid lines = training period.

score for the positive events (CoPos) and low composite score for the negative events (CoNeg), respectively. The scale displays good internal reliability ( $\alpha = 0.89$  for CoPos and  $\alpha = 0.91$  for CoNeg), and good convergent validity with the attributional style questionnaire ( $r_s > 0.70$ ).

**2.4.1.2. Psychological distress.** The general health questionnaire 30 (GHQ-30; Goldberg, 1972) has been used extensively in the detection of non-psychiatric distress. Scores range 0–30, with high scores indicating a greater degree of psychological distress. A score of 5 or above indicates the incidence of acute or episodic distress warranting attention. The scale has been widely validated (Goldberg, 1978) and used in occupational studies (Wall & Clegg, 1981). The alpha coefficient in the present study was 0.93.

**2.4.1.3. Job satisfaction.** The overall job satisfaction scale (Warr, Cook, & Wall, 1979) is a 15-item measure in which respondents indicate on a seven-point scale their satisfaction with intrinsic and extrinsic features of their job. An unweighted total ranging from 15 to 105 is computed, with higher scores indicating higher job satisfaction. The scale has been used in a range of occupational settings and its alpha coefficient in this study was 0.85.

**2.4.1.4. Self-esteem.** The professional self-esteem scale (adapted from Beehr, 1976) is a three item scale designed to measure self-esteem in job-related contexts. The items are bipolar adjectival descriptors (successful-not successful; important-not important; doing my best-not doing my best) on a seven-point continuum. In this study, the scale was extended to include a further three items: (a) capable-not capable, (b) effective-not effective, and (c) confident-not confident. A post-hoc analysis of the six-item scale indicated that it possessed good internal consistency ( $\alpha = 0.90$ ).

**2.4.1.5. Job withdrawal cognitions.** The intention to quit scale (Guest, Peccei, & Thomas, 1993) consists of three items answered on a seven-point scale ranging from 'strongly agree' to 'strongly disagree', yielding a scale range of 3–21. The items have good internal consistency ( $\alpha = 0.72$ ) and that they cluster into one factor (Guest et al., 1993). The internal consistency of the scale in this study was acceptable ( $\alpha = 0.68$ ).

**2.4.2. Organisational outcomes**

'Bottom-line' financial results were measured primarily by resignations from the company and by sales productivity. Resignations were monitored throughout the 8 months of the study and for a further 10 months, both for the two study groups and for a large group of non-participating employees ( $n = 932$ ) from the same four company divisions, performing the same job and matched for length of service. Aggregated data were also provided by the company on participants' sales productivity, compared with other employees from the same four divisions, for 2 years after the program.

**2.5. Analyses**

Analysis of covariance (using the *regress* command of *Stata* release 10 – *StataCorp*, 2008) was used to test for differences between the two study groups on each psychological variable (with separate analyses at each follow-up time). Covariates included division membership (four levels) and the corresponding baseline measure of the variable. Comparison of the pre- and post-training psychological data for the waiting-list control group was undertaken by *t*-tests (see Table 2). Resignation data were analyzed by  $\chi^2$  tests and survival analysis.

Mediational analyses were carried out using the procedure advocated by Baron and Kenny (1986) again using *Stata's regress*

**Table 2**  
Means and standard deviations for initial training group and waiting-list control group

	Initial training group			Waiting-list control group			
	T1	T2	T3	T1	T2	T3	T4
<i>Training conditions (M; SD)</i>							
CoPos	16.51; 2.0	17.95; 1.89	18.01; 2.02	16.52; 1.8	16.33; 2.29	16.54; 2.04	17.85; 1.99
CoNeg	14.73; 2.44	12.76; 3.07	12.98; 3.01	14.63; 2.37	14.91; 2.53	14.96; 2.39	13.05; 3.01
Self-esteem	3.85; 0.88	4.45; 0.85	4.46; 0.94	3.97; 0.85	3.94; 0.84	3.86; 0.75	4.47; 0.76
Job satisfaction	74.1; 11.57	77.12; 11.36	79.21; 11.65	72.32; 12.33	71.67; 13.19	73.36; 13.42	76.94; 11.56
Intention to quit	10.75; 3.89	9.01; 3.95	9.05; 4.05	10.73; 4.1	10.79; 4.19	10.39; 4.33	8.96; 3.63
Psychological distress	8.1; 7.67	2.64; 5.13	2.88; 6.57	7.09; 6.79	6.12; 7.20	4.37; 5.86	1.18; 1.29

Both groups completed psychological measures on three occasions: T1 before the first series of courses; T2 at the end of the first series; and T3 at the 3 month follow-up (which also provided a baseline for the waiting-list-control training). The waiting-list control group also completed measures after their training program (T4).

command, with division, baseline measure of the putative mediator and the baseline measure of the relevant outcome measure being included as covariates at all three stages of the analyses. The stages were: (1) demonstrate an effect of the intervention on the outcome, (2) demonstrate an effect of the intervention on the proposed mediator, and (3) investigate the joint effects of intervention and proposed mediator on outcome. The purpose of stage 3 is to demonstrate a reduction in the size of the effect of the intervention after controlling for the mediator, and to demonstrate that there is an influence on the mediator on outcome after controlling for the initial intervention (i.e. there is evidence of a mediated effect). Stages 1 and 2 both investigate the effect of a randomized intervention and are therefore not subject to possible confounding. The estimates arising in stage 3, however, may be invalid. They are only valid if it is correctly assumed that there is not hidden confounding between the mediator and the outcome (highly unlikely). Statisticians have recently developed methods to overcome this

problem (see Albert, 2008; Dunn, 2007; TenHave et al., 2007). However, they are based on the validity of other assumptions: that there are group by covariate interactions in the model predicting the proposed mediator, but not in the effect of mediator on outcome or in the direct effect of intervention on the outcome (i.e. homogenous treatment effects). Here we use the methods described by Dunn (2007) and by Albert (2008) and refer to the method of analysis as an 'extended instrumental variable regression': the instrumental variables being the above covariate by intervention interactions. We use *Stata's ivreg* command.

### 3. Results

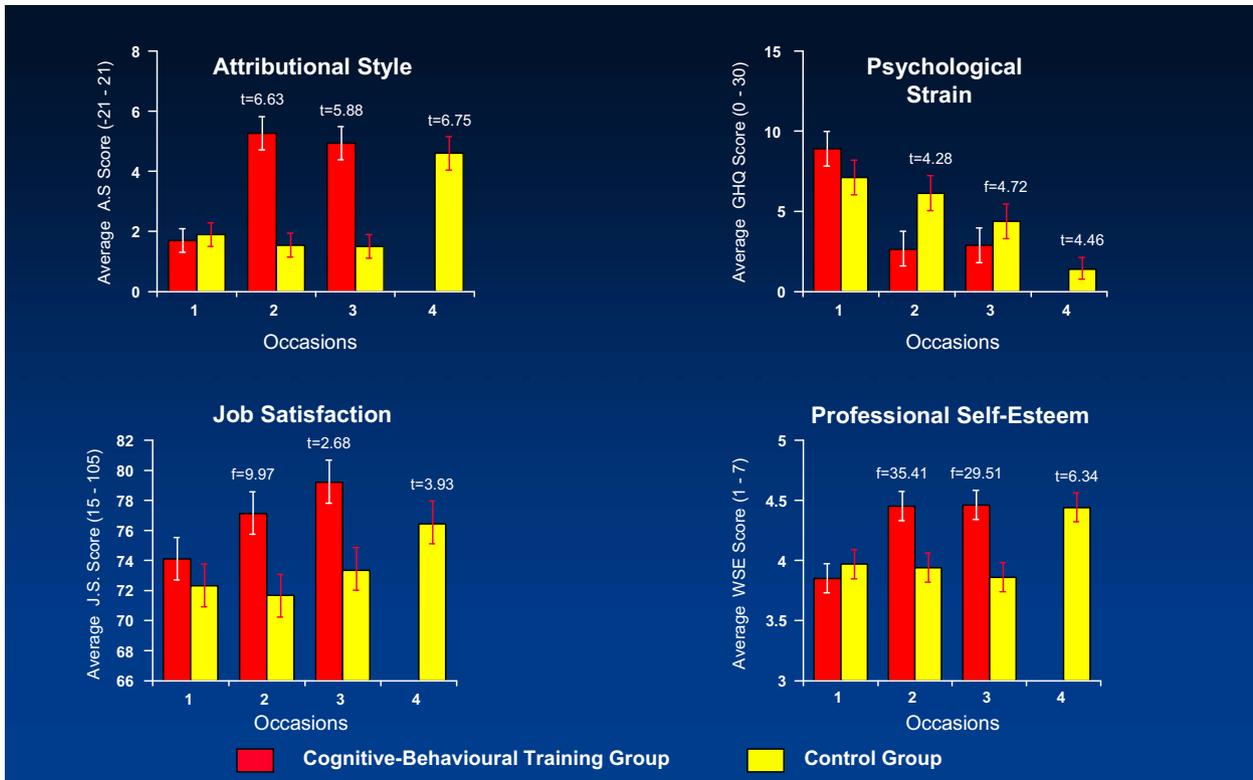
#### 3.1. Psychological outcomes

Table 2 shows summary statistics for psychological measures administered before and after the intervention. There was a consistent improvement in all psychological variables—attribitional style, self-esteem, job satisfaction, intention to quit and psychological distress at the end of the first series of programs that was not seen in the waiting-list controls at that time. Furthermore, the improvements persisted: by the 3-month follow-up, there were still significant differences between the 'initial' trained group and the 'waiting-list' group on all the psychological variables. Results of the formal analyses of covariance for the various outcomes are provided in Table 3. Note that all of the intervention effects are statistically-significant and effect sizes are large. The same improvements occurred in the 'waiting-list' group after their training (Fig. 2).

Notably, on the GHQ-30, there was a decline in the percentage of scores > 5 (indicative of psychological distress requiring attention), after training in both cohorts ( $\chi^2 = 26.2, 10.72$ , respectively,  $df = 1, p < 0.01$ ). Initially, 37% of the total sample experienced levels of psychological distress that were above this cut-off, which re-

**Table 3**  
Formal estimates of the impact of CBT on various outcomes

Variable	ITT/total effect (se) (difference in means)	95% Confidence interval	p-Value
Copos T2	+1.64(0.31)	+1.03 to +2.25	<0.001
Copos T3	+1.46(0.33)	+0.82 to +2.11	<0.001
Coneg T2	-2.10(0.45)	-0.65 to -0.28	<0.001
Coneg T3	-2.18(0.47)	-3.11 to -1.24	<0.001
Job satisfaction T2	+3.69(1.28)	+1.16 to +6.22	0.005
Job satisfaction T3	+4.52(1.64)	+1.27 to + 7.77	0.007
Intention to quit T2	-1.87(0.50)	-2.85 to -0.88	<0.001
Intention to quit T3	-1.16(0.57)	-2.28 to -0.04	0.043
Self-esteem T2	+1.45(0.49)	+0.48 to +2.43	0.004
Self-esteem T3	+0.74(0.12)	+0.50 to +0.99	<0.001
Psychological distress T2	-4.03(0.91)	-5.83 to -2.23	<0.001
Psychological distress T3	-2.21(1.02)	-4.22 to -0.20	0.031



**Fig. 2.** Comparison of 'initial' group with 'waiting-list' group: 1 = before 'initial' courses; 2 = after 'initial' courses; 3 = 3-month follow-up (also baseline for the 'waiting-list' group); and 4 = after training of 'waiting-list' group. Bars show standard errors of the mean calculated separately for each group on each occasion.

duced to 10% after training. Further, there was statistically and occupationally significant change in participants' intention to quit from 'probably' to probably not'.

3.2. Organizational outcomes

3.2.1. Employee turnover

Data were consistent with the indices of psychological improvement. There were three times as many resignations in the 'waiting-list' group (10/85; 12%) as in the 'initial' trained group (3/81; 4%)

during the 4.5 months from the commencement of the first series of programs to the three-month follow-up point ( $\chi^2 = 3.73$ ,  $df = 1$ ,  $p = 0.05$ ). A similar reduction in turnover took place when the waiting-listed group underwent their training: by the end of the seven-week program, quitting was 1.3%. The equivalent figure in the 'initial' group (i.e. at the end of their 7-week course) was 2.5%. As the rates did not differ ( $\chi^2 < 1$ ), the data from the two groups were combined and compared with the large cohort of non-participating controls ( $n = 932$ ), revealing a significant reduction in turnover during the 8 months in which the training program took place:

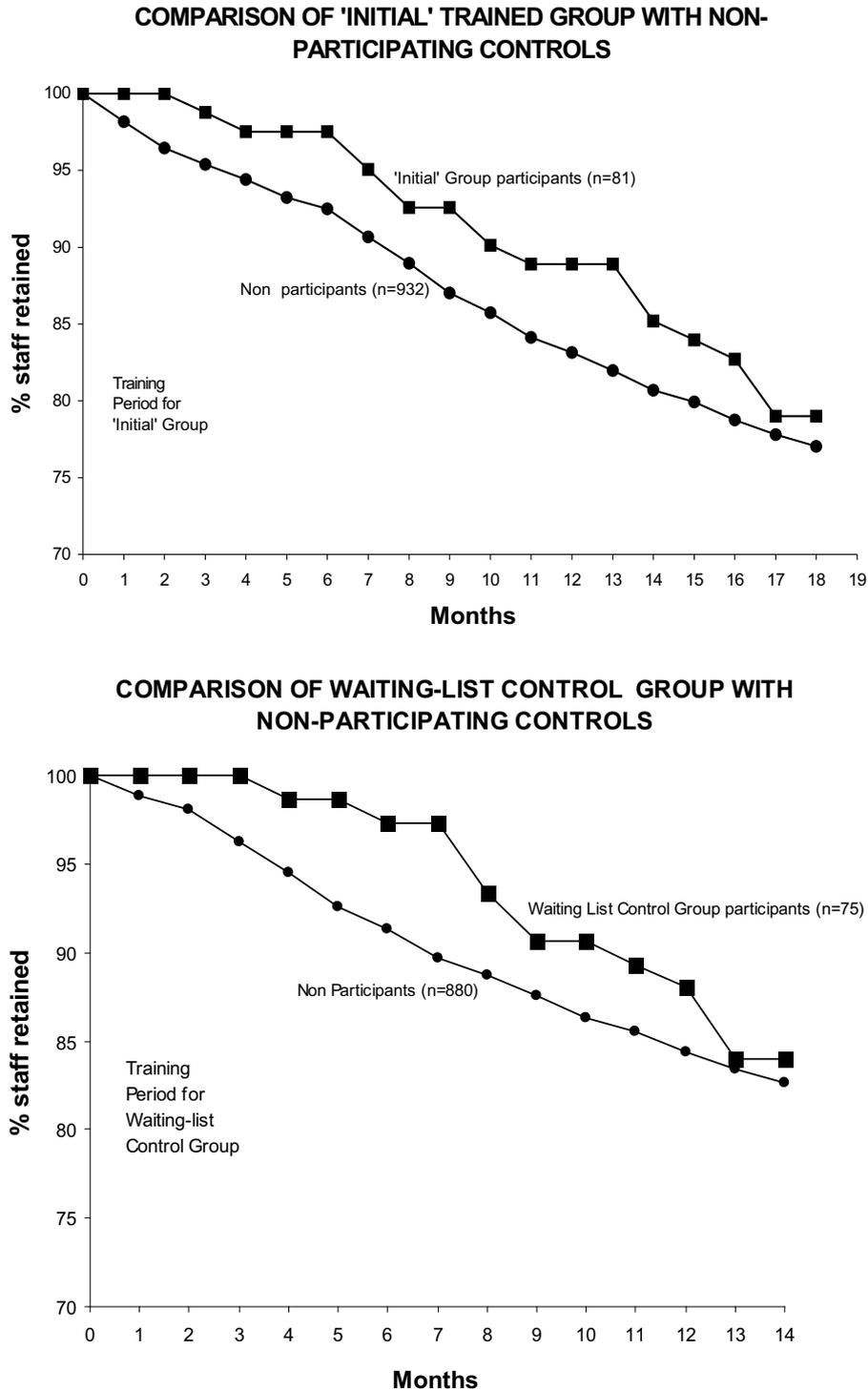


Fig. 3. Staff retention analysis: CBT 'initial' participants (n = 81) and CBT 'waiting-list' participants (n = 75), each compared with non-participating employees (n = 932) in terms of percentage of staff retained throughout the period of the courses and for a further 10 months.

non-participating controls 103/932 (11%), trained employees 7/156 (4%);  $\chi^2 = 6.34$ ,  $df = 1$ ,  $p < 0.02$ . There was no further change for the 10 months of follow-up, the rates of decline reverting to parallel, as verified by survival analysis (Wilcoxon statistic = 0.11 and 0.14, respectively,  $p = 0.74$  and 0.71) (Fig. 3).

### 3.2.2. Productivity

Only aggregated annual sales figures were available from the company. In the 2 years post-training, 50% of the two trained groups had achieved sales figures that were above the average for their division, with a further 15% performing within 5% of the average.

### 3.3. Exploration of the role of attributional style as a mediator of the intervention effects on outcomes

Using the Baron and Kenny procedure, we see from Table 4(a) that there appears to be a mediating effect of Copos on job satisfaction. The estimated direct effect of the intervention is considerably smaller than the total effect (mediation is explaining about half of the total effect), consistent with the statistically-significant effect of the mediator on the outcome (note that the total effects differ slightly from those in Table 3, arising from the inclusion of an extra covariate, baseline value of the mediator). The use of the extended instrumental variable regression, however, suggests that this may not be a safe finding – see top rows of Table 2(b). It is possible that the apparent mediation found in the Baron and Kenny analysis is an artifact created by hidden confounding. Unfortunately the instrumental variable regression results are very imprecise (a price we pay for acknowledging that there may be hidden confounding) but provide no support for the conclusion that the direct effect is any smaller than the total effect of the intervention. The rest of Table 2 suggests that there is no convincing evidence of the mediating role of Copos. A similar series of analyses using Coneg as the putative mediator (not shown) also failed to reveal any evidence of mediation.

## 4. Discussion

Significant improvements in employees' attributional style, psychological distress, self-esteem, job satisfaction and intention to

quit resulted from the cognitive-behavioural training program. The improvements persisted to the 3-month follow-up point (the longest follow-up period possible due to organizational constraints), thereby indicating that the effect of the cognitive-behavioural training transferred to the day-to-day work of the employees and was maintained after the end of training. Symptoms of psychological stress warranting intervention reduced from 37% of the sample to 10% after training. Typically, 20% of employed samples are above the cut-off of psychological distress (Warr, 1984) – our results compare well therefore, considering the organization was undergoing a large-scale change, which many employees found distressing.

The psychological changes were accompanied by a 66% reduction in employee turnover, relative to the waiting-listed control group (4% vs. 12%, respectively). Further, our results indicated that the training program acted to prevent, not merely delay, resignations in employees many of whom, pre-training, were low performers and therefore likely to have a higher than average resignation rate. In the period following training, rates of resignation reverted to average. Such improvements in employee turnover represent a large saving for organizations in the cost of replacing staff, as well as minimizing disruption.

Participants' productivity also improved. Two years post-training, 65% of the sample achieved sales figures that were above the average or within 5% of the average for their division. Considering that before training, only 29% of the participants were deemed to be performing at an acceptable standard (that is, reaching their sales or earnings targets), this result suggests that the cognitive-behavioural program had a positive impact on sales agents' productivity in addition to their job retention.

With regard to mediation, it is not possible to demonstrate that a variable B is a mediator of the effects of A on C. All we can do is see whether the data appear to be consistent with the hypothesis and to try to get valid estimates of the causal effects. One problem is that we cannot demonstrate that attributions changed earlier than the main outcomes. Although there is an effect of CBT on attribution and on the other psychological outcomes, there is no convincing evidence that attributions acted as mediators. Further research therefore is needed to isolate the mechanism(s) through which cognitive-behavioural interventions operate.

**Table 4**  
Estimates (and standard errors) of the total, direct and mediated effects of the intervention on job-related outcomes

Outcome variable	Putative mediator	Total effect <sup>a</sup> difference in means	Direct effect difference in means	Effect of mediator on outcome regression coefficient
<i>(a) Standard regression/ANCOVA</i>				
Job satisfaction T2	Copos T2	+3.89(1.37)	+2.39(1.48)	-0.79(0.38)
Job satisfaction T3	Copos T3	+4.60(1.74)	+2.45(1.81)	-1.88(0.48)
Intention to quit T2	Copos T2	-1.50(0.49)	-1.39(0.56)	+0.09(0.52)
Intention to quit T3	Copos T3	-1.28(0.60)	-0.91(0.64)	+0.39(0.17)
Self-esteem T2	Copos T2	+0.59(0.11)	+0.58(0.12)	-0.004(0.031)
Self-esteem T3	Copos T3	+0.53(0.14)	+0.53(0.14)	-0.15(0.03)
Psychological distress T2	Copos T2	-3.65(0.96)	-3.32(1.07)	+0.27(0.27)
Psychological distress T3	Copos T3	-2.49(1.07)	-2.47(1.16)	+0.38(0.29)
<i>(b) Extended instrumental variable regression</i>				
Job satisfaction T2	Copos T2	+3.89(1.37)	+4.43(2.54)	+0.54(1.38)
Job satisfaction T3	Copos T3	+4.60(1.74)	+3.01(3.17)	-1.48(1.93)
Intention to quit T2	Copos T2	-1.50(0.49)	-2.23(1.11)	-0.41(0.59)
Intention to quit T3	Copos T3	-1.28(0.60)	-1.97(1.15)	-0.33(0.65)
Self-esteem T2	Copos T2	+0.59(0.11)	+1.00(0.27)	+0.25(0.14)
Self-esteem T3	Copos T3	+0.53(0.14)	+0.93(0.25)	+0.13(0.14)
Psychological distress T2	Copos T2	-3.65(0.96)	-6.20(2.37)	-1.48(1.27)
Psychological distress T3	Copos T3	-2.49(1.07)	-3.51(2.20)	-0.68(1.25)

<sup>a</sup> From the standard regressions.

Nevertheless, our results fit with reviews demonstrating the link between occupational stress, well-being and performance, including withdrawal behaviours (Cotton & Hart, 2003). To our knowledge, our study is the first empirical evaluation of the effects of cognitive-behavioural training on organizational outcomes. Whilst cognitive-behavioural principles are now universally accepted in clinical contexts, this study demonstrates that the core principles and processes are translatable to non-clinical contexts, with measurable and organizationally significant benefits.

The follow-up period, which was restricted to 3 months for organizational reasons, is a major limitation of our study. Similarly, the fact that our sample was 98% male limits the generalisability of findings. Our results need to be replicated on different occupational samples, across a wide range of companies/industries. Nonetheless, our results show that the application of cognitive-behavioural training has important organizational outcomes; the process by which these outcomes is achieved remains for future research to delineate.

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This paper is dedicated to Professor Jeffrey Gray, our mentor colleague and collaborator on this study.

### References

- Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*, 49–74.
- Albert, J. M. (2008). Mediation analysis via potential outcomes models. *Statistics in Medicine, 27*, 1282–1304.
- Alloy, L. B., Abramson, L. Y., Metalsky, G. I., & Hartlage, S. (1988). The hopelessness theory of depression: Attributional aspects. *British Journal of Clinical Psychology, 27*, 5–21.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: The Guilford Press.
- Beehr, T. A. (1976). Perceived situational moderators of the relationship between subjective role ambiguity and role strain. *Journal of Applied Psychology, 61*, 35–40.
- Corr, P. J. (2007). Personality and psychology: Hans Eysenck's unifying themes. *The Psychologist, 20*, 666–669.
- Corr, P. J., & Gray, J. A. (1995). Attributional style, socialisation and cognitive ability as predictors of sales success. *Personality and Individual Differences, 18*, 241–252.
- Corr, P. J., & Gray, J. A. (1996). Attributional style as a personality factor in insurance sales performance in the UK. *Journal of Occupational and Organizational Psychology, 69*, 83–87.
- Cotton, P., & Hart, P. M. (2003). Occupational well-being and performance: A review of organisational health research. *Australian Psychologist, 38*, 118–127.
- Cronbach, L. (1957). The two disciplines of scientific psychology. *American Psychologist, 12*(11), 671–684.
- Dunn, G., & Bentall, R. (2007). Modelling treatment effect heterogeneity in randomised controlled trials of complex interventions (psychological treatments). *Statistics in Medicine, 26*, 4709–4745.
- Eysenck, H. J. (1997). Personality and experimental psychology: The unification of psychology and the possibility of a paradigm. *Journal of Personality and Social Psychology, 73*, 1224–1237.
- Glassop, L. (2002). The organisational benefit of teams. *Human Relations, 55*, 225–249.
- Glisson, C., Dukes, D., & Green, P. (2006). The effects of the ARC organizational intervention on caseworker turnover, climate, and culture in children's service systems. *Child Abuse and Neglect, 30*, 855–880.
- Goldberg, D. (1972). The detection of psychiatric illness by questionnaire. *Maudsley Monograph No. 21*. London: Oxford University Press.
- Goldberg, D. (1978). *Manual of the general health questionnaire*. Windsor: NFER Nelson.
- Guest, D., Peccei, R., & Thomas, A. (1993). The impact of employee involvement on organisational commitment and 'them and us' attitudes. *Industrial Relations Journal, 24*, 191–200.
- Hom, P. W., Robertson, L., & Ellis, A. (2008). Challenging convention wisdom about who quits: Revelations from corporate America. *Journal of Applied Psychology, 93*(1), 1–34.
- Huang, T., Lawler, J., & Lei, C. Y. (2007). The effects of quality of work life on commitment and turnover intention. *Social Behavior and Personality, 35*, 735–750.
- Leahy, R. L. (2004). *Contemporary cognitive therapy: Theory, research and practice*. New York: Guilford Press.
- Pazy, A., Ganzach, Y., & Davidov, Y. (2006). Decision-making training for occupational choice and early turnover: A field experiment. *Career Development International, 11*(1), 80–91.
- Peterson, C., Semmel, A., Von Baeyer, C., Abramson, L. Y., Metalsky, G. I., & Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research, 6*, 287–300.
- Phillips, J. M. (1998). Effects of realistic job previews on multiple organisational outcomes: A meta-analysis. *Academy of Management Journal, 41*, 673–690.
- Proudfoot, J. (1996). *The application of attributional training and cognitive therapy to occupational settings*. Ph.D. Thesis. London: University of London.
- Proudfoot, J. G., Corr, P. J., Guest, D. E., & Gray, J. A. (2001). The development and evaluation of a scale to measure occupational attributional style in the financial services sector. *Personality and Individual Differences, 30*, 259–270.
- Proudfoot, J., Guest, G., Carson, J., Dunn, G., & Gray, J. (1997). Cognitive-behavioural training increases job-finding among long-term unemployed. *The Lancet, 350*, 96–100.
- Ruwaard, J., Lange, A., Bouwman, M., Broeksteeg, J., & Schrieken, B. (2007). Emailed standardised cognitive-behavioural treatment of work-related stress: A randomised controlled trial. *Cognitive Behaviour Therapy, 36*, 179–192.
- Seligman, M. E. P., Castellon, C., Cacciola, J., Schulman, P., Luborsky, L., Ollove, M., & Downing, R. (1988). Explanatory style change during cognitive therapy for unipolar depression. *Journal of Abnormal Psychology, 97*, 13–18.
- Seligman, P., & Schulman, P. (1986). Explanatory style as a predictor of productivity and quitting among life insurance sales agents. *Journal of Personality and Social Psychology, 50*, 832–838.
- StataCorp. *Stata Release 10*, 2008. College Station, Texas.
- TenHave, T. R., Joffe, M. M., Lynch, K. G., Brown, G. K., Maisto, S. A., & Beck, A. T. (2007). Causal mediation analysis with rank preserving models. *Biometrics, 63*, 926–934.
- Wall, T. D., & Clegg, C. W. (1981). Individual strain and organizational functioning. *British Journal of Clinical Psychology, 20*, 135–136.
- Warr, P. B. (1984). Job loss, unemployment and psychological well-being. In E. VandeVliert & V. Allen (Eds.), *Role transition* (pp. 263–285). New York: Plenum.
- Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology, 52*, 129–148.
- Waung, M. (1995). The effects of self-regulatory coping orientation on newcomer adjustment and job survival. *Personnel Psychology, 48*, 633–650.