Food hygiene training in small to medium sized care settings

Abstract

Adoption of safe food handling practices is essential to effectively manage food safety. This study explores the impact of basic or foundation level food hygiene training on the attitudes and intentions of food handlers (n=135) in small/medium sized care settings, using questionnaires based on The Theory of Planned Behaviour. Interviews were also conducted with food handlers (n=20) and their managers (n=10) to ascertain beliefs about the efficacy of, perceived barriers to and relevance of training.

Most food handlers had undertaken formal food hygiene training; however, many who had not yet received training were preparing food, including high risk foods.

Appropriate pre-training support and on-going supervision appeared to be lacking, thus limiting the effectiveness of training. Findings showed Subjective Norm to be the most significant influence on food handlers' intention to perform safe food handling practices, irrespective of training status, emphasising the importance of others in determining desirable behaviours.

Keywords

Food Handler

Hygiene

Training

Care settings

Introduction

There is significant literature on food hygiene training / education in the hospitality industry (e.g. Sprenger, 1999; MacAuslan, 2001; Worsfold and Griffith, 2003; Seaman and Eves, 2006), but very few articles (e.g. Worsfold, 1996) specifically relate to food hygiene training / education of care setting workers. 'Care setting' represents premises such as children's nurseries, day-care settings, pre-schools, respite units, and residential homes. Those most vulnerable or 'at risk' groups of contracting food-borne illness are the young, elderly, sick and the immuno-compromised (Käferstein *et al.*, 1997), many of which are fed and cared for in care settings. It is notable that 28% of all outbreaks of infectious intestinal disease (which includes food-borne illness) reported between 1992 and 2000, originated in residential establishments (Meakins, *et al.*, 2003).

Strategies for reducing the incidence of food poisoning or food-borne illness have been debated for some time (Charles, 1982; Gilbert, 1983), with a dual approach based upon legislation and education advocated (Charles, 1982; Todd, 1989). Thus, the UK Food Safety Act 1990 requires mandatory food hygiene education or training for all food handlers. Studies (Howes *et al.*, 1996; Powell *et al.*, 1997), however, have indicated that increased knowledge may not result in desired changes in food handling behaviour. Worsfold (1996) found that the standards of food handling practices in day nurseries were high, despite some kitchen and nursery assistants having no formal food hygiene training. However, there is a lack of literature discussing the provision of food hygiene training to food handlers in care settings.

Several authors provide support for the use of the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) in the prediction of a wide range of

behaviours, including food handling (Clayton *et al.*, 2002), and hand hygiene, (Jenner *et al.*, 2002). The TRA assumes that behaviour is preceded by intention to perform a behaviour, which in turn is preceded by attitudes and beliefs about the behaviour. The TRA, however, appears to be a poor predictor of behaviours that are not under volitional control. Thus Ajzen (1985, 1988 and 1991) added *Perceived Behavioural Control* (Godin and Kok, 1996), creating the Theory of Planned Behaviour (Fig 1). Perceived Behavioural Control (PBC) reflects personal beliefs about how easy or difficult performing the behaviour is likely to be (Ajzen, 1991), acting as both a proxy measure of actual control and a measure of confidence in one's own ability (Armitage and Conner, 2000). It is assumed to reflect external factors (e.g., availability of time, money, or social support) as well as internal factors (e.g., ability, skill, information) (Ajzen and Timko, 1986). It is assumed that greater perceived control increases the likelihood that enactment of the behaviour will be successful (Armitage and Conner, 2000). The TPB model has been shown to successfully predict intention, in single action behaviours, and across general behavioural categories (Godin and Kok, 1996; Armitage and Conner, 2001; Sheeran, 2002).

Clayton *et al.*, (2002) suggested that effective design of training for food handlers requires an understanding of the factors underlying food hygiene behaviour in the workplace. This paper explores the influences on food handlers' intention to perform safe food handling behaviours, including physical and psychological barriers.

Methods

This study adopted quantitative and qualitative approaches. Food handlers from care settings completed a questionnaire based on Theory of Planned Behaviour, and in-depth interviews were conducted with food handlers and their managers.

Quantitative approach

The TPB model was used to evaluate the relative impact of different influences on the intentions of food handlers to carry out safe food handling practices at every opportunity. Safe food handling, in this study, is any action of the food handler to ensure safe food.

Modal beliefs were elicited from a representative sample of the population to facilitate the development of the main TPB questionnaire, as advocated by Ajzen and Fishbein (1980), and as used in previous research of food handling behaviour (Clayton *et al*, 2002). The elicitation questionnaire was designed after Clayton *et al*, (2002), and included three questions which were completed by a convenience sample of food handlers (n=60) working in Small to Medium sized Enterprises (SME's), and who were due to (n=30), or had attended (n=30) accredited / formal food hygiene training. The most frequently mentioned responses were used in the main TPB questionnaire.

Q.1 Who would approve and disapprove of you carrying out safe food handling practices on every occasion?

This question was used to derive Normative Belief statements, scaled -3 (Very unlikely) - +3 (Very likely). They were phrased as:

.....*think I should carry out safe food handling practices*

1. <i>Customers</i>	4. <i>My Company</i>
2. <i>Managers</i>	5. <i>My Colleagues</i>
3. <i>Environmental Health Officers</i>	

Motivation to Comply statements were created to match, e.g. *Generally speaking I want to do what my manager thinks I should do*, (+ 1 (Very unlikely) - +7 (Very likely)).

Q.2 Please list the advantages or good things that would happen to you if you carried out safe food handling practices at every appropriate occasion during your working day

Q.3 Please list any disadvantages or bad things that would happen to you if you carried out safe food handling practices at every appropriate occasion during your working day

These questions were used to construct the Behavioural Belief (BB) statements, using the 17 most frequently mentioned responses. These were scaled -3 (Very unlikely) - +3 (Very likely) and phrased as follows: -

Carrying out safe food handling practices means / (No. 4 = is)

1. <i>Less food poisoning</i>	10. <i>I may gain a promotion</i>
2. <i>Better personal hygiene</i>	11. <i>I get intimidated by my colleagues</i>
3. <i>Less time for other tasks</i>	12. <i>A safer working environment</i>
4. <i>Time consuming</i>	13. <i>A cleaner kitchen</i>
5. <i>Happier clients / customers</i>	14. <i>Better kitchen organisation</i>
6. <i>Achieving a good reputation</i>	15. <i>Being given more responsibility</i>
7. <i>Increased personal satisfaction</i>	16. <i>People get food poisoning</i>
8. <i>I would gain praise from my boss</i>	17. <i>Being given more pressure</i>
9. <i>I may gain a pay rise</i>	

Seventeen matching Outcome Evaluation (OE) statements were created, for example:

Carrying out safe food handling practices to ensure less food poisoning is... (-3 (Very bad) - +3 (Very good))

Attitude (A) is sometimes measured by asking a number of questions designed to account for the presumed multidimensional nature of attitude. Some authors,

including Ajzen and Fishbein (1980), however, state that the respondent can be asked to provide a direct indication of his attitude. This study uses a single direct measure of Attitude (A):

Carrying out safe food handling practices is... (-3 (Very Bad) - +3 (Very good))

Subjective norm refers to the person's perception that important others desire the performance or non-performance of a specific behaviour (Ajzen and Fishbein, 1980).

The Subjective Norm (SN) statement was phrased as: -

Most people who are important to me think I should carry out safe food handling practices. (+3 (Very likely) - -3 (Very unlikely))

The Behavioural Intention statement was phrased as: -

In the next week I intend to carry out safe food handling practices at every opportunity. (+3 (very likely) - -3 (very unlikely))

Perceived Behavioural Control (PBC) was phrased as: -

If I wanted to I could carry out safe food handling practices on every occasion, (-3 (Definitely untrue) - + 3 (Definitely true))

The Control Belief (CB) statement was phrased as: -

For me to carry out safe food handling practices on every occasion would be (-3 (Definitely impossible) - + 3 (Definitely possible))

Further questions ascertained the respondents' gender, and employment status, and whether they worked with high-risk foods. A final question asked respondents to leave contact details if they were willing to take part in further parts of the study.

Qualitative approach

In-depth, semi-structured interviews were conducted with food handlers, who worked in care settings, and their managers. All interviews were conducted by telephone, and recorded, with permission, using a two way telephone recording device.

Based on the outcomes of the TPB questionnaire, interview schedules were developed for food handlers to gain further insight into issues within the food handlers' workplace that could facilitate or impede safe food handling practice, personal beliefs about the efficacy of food hygiene training, perceived barriers to such training, and the relevance of such training to their own food handling responsibilities.

The interview schedule for care setting managers explored their opinions about food hygiene training, investigating the motivational support offered to food handlers before and after training and their views on improvements in standards after training. The interview schedules allowed the individuals the opportunity to relate their own experiences and to describe events that seemed significant to them.

Sampling

TPB questionnaires were distributed through Training Providers or by hand delivery in the South-west of England. Subsequent analysis proved the samples to be equivalent. In total 135 completed questionnaires from food handlers working in small to medium sized care settings were used for analysis. Telephone contact

numbers provided by food handlers completing the questionnaire were used to arrange food handler and managerial interviews. In total 30 telephone interviews were carried out with care setting personnel (20 food handlers – 10 prior to and 10 following training - and 10 managers).

Analysis of data

Questionnaire responses were coded and data entered into the Statistical Package for the Social Sciences, (SPSS) Version 11. Correlations between TPB components tested the assumptions of the model, and regression identified the main drivers of intention. T-tests were used to compare data between those who had and had not been trained.

Interviews were transcribed verbatim from recordings and then analysed using content analysis, a method which aims to reduce the data (Flick, 2002). Data were categorised against key themes, linked to the questions posed. Thus categories were brought to the data, rather than derived from the data, consistent with the use of content analysis (Flick, 2002). The data were reduced by repeatedly assessing the transcripts against categories.

Results

Employment, training, and food handling status of respondents

Of the 135 food handlers who completed the TPB questionnaire, 133 were in employment, of which 115 were employed Full Time (FT). Fifty food handlers had not yet received food hygiene training (38 FT and 12 PT) and 83 had previously completed basic or foundation level training (77 FT and 6 PT). Most untrained food handlers (38/50) intended to undertake workplace training, although 52% (43/83) of

trained food handlers had received classroom based training (36% had received workplace training). Twenty five (50%) untrained food handlers prepared food; eight of which prepared high risk foods.

Factors influencing the behavioural intention of food handlers to conduct safe food handling practices at every opportunity.

The relative impact of Attitude (A), Subjective Norm (SN) and Perceived Behavioural Control (PBC) on the food handlers' intention to conduct safe food handling practices at every opportunity was tested on the whole sample group (n= 135). Linear correlations between model components corroborated the assumptions of the TPB (Fig 2). Subjective Norm (SN) had the greatest influence on Behavioural Intention (BI) ($\beta = 0.55$, $p \leq 0.001$), followed by PBC ($\beta = 0.24$, $p \leq 0.001$). Attitude (A) did not have a significant influence on BI ($\beta = 0.12$, $p = 0.075$). The direction of influence for AB, SN and PBC was positive. The variance accounted for in the intention to carry out safe food handling practices at every opportunity was 45% (adj. $R^2 = .445$, $p \leq 0.001$). Results thus suggest that other people's opinions were the most significant factor affecting the intention of food handlers to conduct safe food handling practices at every opportunity. Respondents indicated that they were more likely to comply with the Environmental Health Officer than their company, manager, or colleagues.

The main statistical difference ($p < 0.05$) between those who had and had not been trained was found in relation to the SN construct (pre-training mean score = 0.9400 – post-training mean score = 1.800, $t = -2.17$, $df = 85.7$, $p = 0.033$). This suggests that respondents after food hygiene training had a greater belief that most people who are important to them want them to carry out safe food handling practices.

Attitudes towards food hygiene training

The majority (9/10) of untrained food handlers interviewed indicated that their manager had not discussed their food hygiene training needs during the early stages of employment. However, most managers (9/10) indicated that they discussed training needs during their employees' induction period. It is possible that training given by peers or managers within the workplace was not recognised by the food handler as training.

Four managers indicated that they provided food hygiene training immediately before food handlers started working, thus demonstrating a commitment to food safety.

Other managers (n=6), however, reported a lack of course availability, particularly free courses. Of these six managers, two were unsure when their food handlers would be trained: *"It would be difficult for me to say but I would imagine within six months"* [Care 3]. The latter responses corroborate reports from food handlers who had been employed for long periods (up to 2 years) without training.

All untrained food handlers interviewed (n=10) were very positive about attending food hygiene training. Some recognised the importance of food hygiene and connected this to their work related activities: - e.g. *"Because it's important and I want to do things right and look after the children"* [Nurseries 70]. Similarly, trained respondents had recognised the importance of training prior to attending e.g. *"I wanted to go as it's important to know about hygiene especially with children around"* [Nurseries 41]. Most managers (5/10) reported that their food handlers had either a 'quite good' or 'fine' attitude towards food hygiene training, and were reasonably enthusiastic before training.

Food handlers who had received training had mainly undertaken a formal classroom based food hygiene course (9/10), and the tenth had undertaken computer based training. When asked about their feelings towards the food hygiene training respondents found the training beneficial and enjoyable *“I learnt some important things about keeping food safe and keeping my hands clean...”* [tic2 (care sector)], *“I found it enjoyable”* [Care 22 (care sector)], and *“It was really good. I found out things that I didn’t know before”* [Nurseries 26]. To investigate any negative reactions to food hygiene training respondents were asked to explain the worst thing about their food hygiene training. Most of the responses were about the test / exam at the end of the course: - *“Probably the exam”* [Nurseries 50], *“Sitting the test at the end”* [Nurseries 1], and *“...the theory”* [Nurseries 33] although one respondent felt that the worst thing about the course was that it was conducted on a Saturday. Both food handlers and managers reported that the content of the food hygiene course was relevant for their needs, e.g. *“...quite relevant really”* [R&B14], and *“Yes, it was very useful...”* [Nurseries 41]

Interviews with both food handlers and managers revealed that most managers (n=8) do not provide support for the food handlers prior to food hygiene training, simply informing the food handler that food hygiene training is mandatory, i.e. *“.... I just tell them it’s mandatory and they have to do it”* [Care 4]. Only one manager provided some form of company incentive to encourage food handlers to complete their food hygiene training: - *“....they are given a bonus”* [Care 2]. Other motivational factors included that the food handler would receive a certificate, i.e. *“They get a certificate at the end...”* [Care 10] or that the food handler would receive new learning, i.e. *“The obvious incentive is that they are taking on new learning....”* [Care 3] These

responses suggest that rewards were not given for the practical application of newly acquired skills or knowledge.

One care setting manager reported providing no support to food handlers after training: - *"I don't support them I just expect them to do it once they have learnt it."*

[Care 9] Some food handlers also revealed that no support was given to them. Others reported managers giving verbal support during team meetings: - *"...they mentioned it at staff meetings so that all the staff know...just informing everybody what's to be done and the new changes and stuff, and the reason why..."* [Nurseries 41] and one manager indicated *"...we do speak to them during our meetings...and if we think there is an issue we kind of like remind them..."* [Care 8]

Only one care setting manager formally monitored the success of food hygiene training: i.e. *"... then they fill in the form when they have been on the course ...then they will fill it again three months later."* [Care 5] Other responses suggest that most managers prefer to use informal approaches, such as visual indicators and subjective interpretation, e.g. *"They are doing everything they should be doing without being asked"* [Care 4] and *"They are more aware of the importance of food hygiene..."* [Care 1] One manager did recognise a change, but acknowledged it may only be short term: -*"...some of them soon revert back to bad practice"* [Care 9]

Discussion

Findings suggest that care setting managers are providing formal accredited food hygiene training for their food handlers, albeit in some cases long after commencement of employment. This is of particular concern as many care settings prepare food for vulnerable groups, such as children or the elderly. Worsfold, (1996)

also found that some nursery staff, including nursery nurses, did not have formal food hygiene training. The '*Industry Guide to Good Hygiene Practice*' (JHIC, 1997) recommends that level 1 food hygiene training (equivalent to a basic or foundation accredited course), is provided to food handlers within three months of employment. Findings suggest that care setting managers are aware of their responsibility to provide food hygiene training, but that in some cases training is not provided within the recommended period.

A number of authors (Griffith, 2000; Seyler *et al.*, 1998; Noe and Schmitt, 1986) have noted that managers / supervisors have an important role in setting an appropriate culture within the work environment and providing conditions that facilitate behavioural change. The Audit Commission (1990) linked both a lack of management awareness and negative attitudes towards hygiene to a business representing a significant or high risk to public health. In addition, food handlers' intentions to perform safe food handling practices on all occasions was most strongly influenced by perceptions of what others thought they should do. The belief that most people (including managers) who are important to them want food handlers to carry out safe food handling practices increased following training, thus emphasising the importance of others in determining desirable behaviours. However, managers in this study were not providing sufficient support either before or after training to stress the importance of the training or encourage the long term transfer food hygiene skills into the workplace, thus any positive effects gained from training may be ephemeral. The importance of training in relation to a responsibility to protect the people they serve should be emphasised prior to training, reinforcing the positive attitudes of handlers. Rewards, where they were offered, were linked to attendance of a course, rather than demonstration of new skills. Worsfold *et al.*, (2004) indicated that rewards based on

adapting attitudes or positive behaviours prescribed in training is a major determinant of whether trainees will demonstrate learned attitudes or behaviours. Thus incentives could be offered against measurable targets, which demonstrate an improved attitude or behaviour towards safe food handling practices. Billsborough, (1999) recommends keeping records of staff training and reviewing these each year to enable management to determine the training needs of both individuals (e.g. if roles and responsibilities have changed) and the business as a whole. This would demonstrate that the business is committed to training, and may also support a defence of due diligence.

Handlers and their managers reported course content to be relevant and in some cases that training had influenced a short-term behaviour change. Findings, however, suggest that training did not influence intentions to perform safe food handling practices on all occasions. However, various authors (MacAuslan, 2001; and Sprenger, 1999), and some Environmental Health Officers (Worsfold *et al*, 2004), have expressed doubts over the content, suitability and assessment of food hygiene courses. Their main concerns focus on the level of the questions, their wording, the topic range, and the lack of emphasis on key topics (Worsfold *et al*, 2004).

In an effort to encourage greater management commitment to food safety training and the supervision of food handlers, new food hygiene legislation (The Food Hygiene (England) Regulations (2006)), places greater emphasis on managers identifying and providing food hygiene training commensurate with work activities and monitoring performance in the workplace. This regulation also advocates training managers to a level commensurate with their work activities and responsibilities. Accordingly a new set of food safety qualifications, including sector specific courses, were launched in 2006 by the nationally accredited awarding bodies. The content is generic in

nature, although training and examination materials have been adapted to suit specific sectors of the food industry (Catering, Manufacturing and Retail), thus making food safety training more relevant to individuals working in those sectors. The new qualifications consist of four levels of training, with Level 4, the highest level of food safety training, aimed at individuals who participate in food handling activities and have a management and/or a training role. This study would suggest that care setting managers, with food safety responsibilities, could usefully undertake a Level 4 qualification, thus ensuring they have sound technical knowledge, commensurate with their management responsibilities, and allowing them to make informed decisions about food safety issues. This technical knowledge, coupled with documented workplace observations, could allow more effective in-house training, thus reducing the potential risk of food poisoning.

Conclusion

Most food handlers had undertaken formal food hygiene training; however, many who had not yet received training were preparing food, including high risk foods.

Appropriate pre-training support and on-going supervision appeared to be lacking, thus limiting the effectiveness of training. Findings showed Subjective Norm to be the most significant influence on food handlers' intention to perform safe food handling practices, irrespective of training status, emphasising the importance of others in determining desirable behaviours.

References

Armitage, C.J., and Conner, M. (2000) Social cognition models and health behaviour: A structured review. *Psychology and Health*: **15**: (2) pp.173-189

Armitage, C.J., and Conner, M. (2001) Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*: **40**: (4) pp.471-499

Audit Commission (1990) *Environmental Health Survey of Food Premises*: London: HMSO

Ajzen, I. (1985) From intentions to actions: a theory of planned behaviour. In: Kuhl J, Beckmann J., (Eds.). *Action-control: from cognition to behaviour*: Berlin: Springer-Verlag, pp.11-39

Ajzen, I. (1988) *Attitudes, personality, and behaviour*: Chicago: Dorsey Press

Ajzen, I. (1991) The Theory of Planned Behaviour: *Organisational Behaviour and Human Decision Processes*: **50**: (1) pp.179-211

Ajzen, I. and Fishbein, M. (1980) *Understanding Attitudes and Predicting Social Behaviour*: Prentice-Hall Inc: NJ, USA

Ajzen, I. and Timko, C. (1986) Correspondence between health attitudes and behaviour. *Journal of Basic and Applied Social Psychology*: **7**: pp.259-76

Billsborough, S. (1999) An approach to food hygiene and safety training. *Health and Hygiene*: **20**: (1) pp.5-10

Charles, R.H.G. (1982) Prevention and control of Salmonella food poisoning: education of the food handler and the consumer. *Health and Hygiene*: **4**: pp.49-53

Clayton, D.A., Griffith, C.J., Price, P., and Peters, A.C. (2002) Food Handlers' beliefs and self-reported practices: *International Journal of Environmental Health Research*: **12**: pp.25-39

Flick, U. (2002) *An Introduction to Qualitative Research*. Sage, London. Pp 190-193

Gilbert, R.J. (1983) Foodborne infections and intoxications recent trends and prospects for the future: In *Food Microbiology Advances and Prospects for the Future*, Ed. T.A. Roberts and F.A. Skinner. Academic Press, London

Godin, G., and Kok, G. (1996) The Theory of Planned Behaviour: A review of its applications to health-related behaviours: *American Journal of Health Promotion*: **11**: (2) pp.87-98

Griffith, C.J. (2000) *Safe Handling of Food*: Marcel Decker, New York, NY, pp.235-56

Howes, M., McEwen, S., Griffiths, M., and Harris, L. (1996) Food handler certification by home study: measuring changes in knowledge and behaviour: *Dairy, Food and Environmental Sanitation*: **16**: pp.737-744

Jenner, E.A., Watson, P.W.B., Miller, L., Jones, F., and Scott, G.M. (2002) Explaining hand hygiene practice: an extended application of the Theory of Planned Behaviour: *Psychology, Health & Medicine*: **7**: (3) pp. 311-326

JHIC (Joint Hospitality Industry Congress) (1997) *Industry Guide to Good Hygiene Practice*: Catering Guide: London: HMSO

Käferstein, F.K., Motarjemi, Y., and Bettcher, D.W. (1997) Food-borne Disease Control: A Trans-national Challenge: *Emerging Infectious Disease*: **3**: (4) October – December, pp.503 - 510

MacAuslan, E. (2001) Food hygiene training in the UK: time for a radical re-think? *The Journal of The Royal Society for the Promotion of Health*: **121** (4) pp.213-219

Meakins, S.M., Adak, G.K., Lopman, B.A., and O'Brien, O.J. (2003) General outbreaks of infectious intestinal disease (IID) in hospitals, England and Wales, 1992-2000: *Journal of Hospital Infection*. **53**: (1) pp.1-5

- Noe, R. and Schmitt, N. (1986) The influence of trainee attributes on training effectiveness: test of a model. *Personnel Psychology*: **39**: (3) pp.497-523
- Powell, S.C., Attwell, R.W., and Massey, S.J. (1997) The impact of training on knowledge and standards of food hygiene – a pilot study. *International journal of Environmental Health Research*: **7**: pp.329-334
- Seaman, P. and Eves, A. (2006) The management of food safety – the role of food hygiene training in the UK service sector. *International Journal of Hospitality Management*: **25**: (2) pp.278-296
- Seyler, D. L., Holton, E.F., Bates, R.A., Burnett, M.F. and Carvalho, M.A. (1998) Factors affecting motivation to transfer training: *International Journal of Training and Development*: **2**: (1) pp.2-16
- Sheeran, P. (2002) Intention-behaviour relations: A conceptual and empirical review. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology*, **12**: (pp.1-36). Chichester, UK: Wiley
- Sprenger, R. (1999) Hygiene training – is it working. *International Food Hygiene*: **10**: (2) pp.31-33
- Taylor, S., and Todd, P. (1995) Decomposition and crossover effects in the theory of planned behaviour: A study of consumer adoption intentions. *International Journal of Research in Marketing*: **12**: pp.137-155
- The Food Hygiene (England) Regulations 2006: S.I. 14/2006. (Available from: http://www.opsi.gov.uk/si/si2006/uksi_20060014_en.pdf)
- Todd, E.C.D., (1989) Costs of acute bacterial food-borne disease in Canada and the USA: *International Journal of Food Microbiology*: **9**: pp. 313-26
- Worsfold, D., (1996) Food safety for babies: *Nutrition & Food Science*: **96**: (6) pp.20-24

Worsfold, D. and Griffith, C.J. (2003) A survey of food hygiene and safety training in the retail and catering industry: *Nutrition & Food Science*: **33**: (2) pp.68-79

Worsfold, D., Griffith, C.J., and Worsfold, P. (2004) A survey of environmental health officers' views of food hygiene training: *British Food Journal*: **106**: (1) pp.51-64

Figure 1.1 Schematic representation of Ajzen's Theory of Planned Behaviour

(Adapted from Taylor and Todd, 1995:p.139)

Figure 1.2 Regression analysis conducted on all care settings questionnaires (n= 135)

Note: * = $p < 0.05$; ** = $p < 0.01$; *** = $p \leq 0.001$

Biographies