Personality and Strategy in Agriculture

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Abstract

Our fundamental aim in this study was to determine whether locus of control influences producers’ strategies and business performance. If traits such as locus of control do influence producers’ behaviour in terms of choice of farm strategy, then extension programs promoting improved farm business management techniques may need to incorporate educational elements to influence producers’ perceptions of control.

The data used in the study were obtained from a mail questionnaire that was distributed to primary producers in the wheat-sheep zone of south-east Australia during the summer of 2001. We identified statistically significant relationships among producers’ locus of control, their farm strategies and farm business performance.

In summary we found that producers with a strongly internal locus of control were:
- More likely than other producers to adopt a prospective farm strategy.
- Less likely than other producers to experience low financial performance.

Conversely we found that producers with a strongly external locus of control were:
- More likely than other producers to adopt a defensive farm strategy.
- More likely than other producers to experience low financial performance.

These findings raise two key implications for the design of extension programs. The first key implication is that those producers most in need of upgrading their business skills may be the least likely to take advantage of extension programs offering such training. The second key implication is that the inclusion of activities aimed at increasing the internality of producers’ locus of control is likely to increase the adoption of new skills and ideas among primary producers.
Introduction and Purpose

Our objective in this study was to determine whether locus of control (Rotter 1966), a personality trait, affects producers’ farm business strategy and business performance by influencing their perceptions of control over key elements of the farm business. If personality traits such as locus of control do influence producers’ behaviour in terms of choice of farm strategy, then extension programs promoting improved farm business management techniques may need to incorporate educational elements to influence producers’ perceptions of control if they are to change producers’ behaviour.

Locus of control is a personality predisposition and describes an individual’s perception of their ability to change a situation. It refers to a set of beliefs about behaviour and success or failure (McNairn and Mitchell 1992). A belief in external control means a person believes an event is largely the product of forces beyond their control. A belief in internal control means a person believes an event is contingent upon their behaviour or actions. Research has demonstrated strong linkages between locus of control and behaviour in areas as diverse as physical and mental health, alcoholism, intellectual achievement among schoolchildren, and producers’ aspirations (Lefcourt 1981, Sia et al. 1985, Hines et al. 1986, van Kooten et al. 1986).

Although locus of control is a personality predisposition, it is multi-dimensional (Lefcourt 1981). This means that while an individual has a general predisposition to exhibit an internal or external locus of control, their locus may vary from one subject area to another depending on their learning, experience and knowledge. Hence, the strength of the relationship between locus of control as a personality trait and behaviour in specific contexts varies (Sia et al. 1985, Hines et al. 1986, Ajzen 1991). In short, an individuals’ locus of control in a particular context depends partly on their general predisposition to be internally or externally oriented, and partly on the learning, experience and knowledge they possess that is relevant to that context. Hence, a distinction can be drawn between locus of control in a specific context and locus of control as a personality predisposition.

In this paper we use the term ‘locus of control’ to refer to the general predisposition or personality trait. We use the term ‘generalised locus of control’ to refer to the quantitative measure of that trait. Where we use the term ‘perceptions of control’, or just simply ‘control’, we are referring to perception of control in terms of a specific dimension or issue (such as perceptions of control over farm costs).

Individuals with a strong internal locus of control believe that they can influence many events in their lives. They believe that they can alter a situation through the exercise of their skills and knowledge. As a consequence, these individuals tend to be motivated to acquire new skills and knowledge. Individuals with a strong internal locus of control tend to be self-confident and believe they can emulate successful peers. In other words, these individuals will tend to exhibit high self-efficacy or mastery (Bandura 1997, Pearlin and Schooler 1978). Consequently, producers with a strong internal locus are likely to believe they can exert a high degree of control over the financial performance of their farms. These producers will
tend to seek opportunities to improve their skill base. They will have the confidence to try new techniques and technologies and to learn from the examples set by peer group leaders (Gist 1989).

Individuals with a strong external locus of control believe that there is little they can do to influence events that occur in their lives. They attribute events and their outcomes to forces outside themselves. Consequently, they believe their capacity to influence a situation through the exercise of their skills and knowledge is limited. Hence, there is little or no incentive for these individuals to acquire new skills and knowledge. Individuals with a strong external locus of control tend to be less confident and tend to believe that the success of peer group leaders is atypical and can be explained by advantages conferred by special circumstances. In other words, these individuals will tend to exhibit low self-efficacy or mastery (Bandura 1997, Pearlin and Schooler 1978). It follows that compared to producers with a strong internal locus of control, producers with a strong external locus of control are less likely to believe they can exert control over the financial performance of their farms. Producers with a strong external locus of control will be less likely to seek opportunities to improve their skill base, are less likely to try new techniques and technologies and believe there is little to learn from the apparently atypical performance of peer leaders.

These differences in producers’ locus of control have implications for producers’ participation in agricultural extension and farm leadership programs. The fundamental objective of these programs is to promote self-reliance among producers and to create a culture of pro-active solution of farm and industry problems. These programs hope to achieve this objective by training producers in the application of new management techniques and technologies and by documenting and publicising examples of successful adoption by peers. The rationale for these programs is that producers can improve the financial performance of their businesses through better management. This rationale is predicated on the idea that better management means greater control over the financial performance of the farm. Farmers with an internal locus of control would find this rationale appealing as it fits with their view of the world. Farmers with an external locus of control would tend to view such a claim with scepticism as it contradicts their view of the world. This raises the possibility that producers with an external locus of control would be much less likely than producers with an internal locus of control to participate in such programs.

Methods/Procedures and Data Sources

Quantitative techniques were used in the study to identify whether reliable relationships were present among the various constructs such as producers’ perceptions of control over farm performance. The data used in the study were obtained from a mail questionnaire that was distributed to primary producers in the wheat-sheep zone of south-east Australia during summer of 2001.
The survey was produced in booklet form and consisted of a number of sections. The survey was piloted with a small group of researchers at UNE. Extensive piloting with producers was not considered necessary as, with one exception, the survey consisted of scales taken from the literature.

In the first section of the survey we sought information from producers on their farm enterprises (area, livestock numbers, and importance of farm income in household income) and demographic information such as the age and level of formal education of the producer. Indicators of the financial performance of the farm business were included in this section. These consisted of producers’ equity in the farm business, the ‘economic hardship’ scale developed by Bultena et al. (1986), and information on producers plans to develop their property, expand or scale back farming operations, and change enterprise mix.

In the second section of the survey we sought information on producers’ perceptions of their ability to control or influence the physical and financial performance of their farm business. Producers’ perception of control over the performance of their farm business was measured using an instrument developed by Kaine et al. (1994). This instrument consists of 27 paired statements describing perceptions of influence over production outcomes, financial outcomes, business expansion and growth. Producers’ responses to these statements were used in aggregate to obtain a measure of their general personality predisposition in terms of locus of control. This measure of locus of control as a general predisposition was validated using the ‘sense of mastery’ scale developed by Pearlin and Schooler (1978).

The survey was distributed with a cover letter and reply paid envelope to primary producers in the wheat-sheep zone of Queensland, Victoria and New South Wales during the summer of 2001. Addresses were drawn from a random sampling of entries in the ‘graziers’ and ‘farmers’ categories of the Yellow Pages in postcodes corresponding to the wheat-sheep zone. A reminder postcard was distributed four weeks after the initial mailing.

The analysis of the data primarily involved the use of analysis of variance and cross tabulations (Cooksey 1997, Tabachnik and Fidell 1989). Cluster analysis was used to classify producers into strategic types based on their perceptions of control over the physical and financial performance of their farm enterprises (Aldenderfer and Blashfield 1984). Factor analysis was used to construct a measure of producers’ general predisposition to an internal or external locus of control (Cooksey 1997, Tabachnik and Fidell 1989). A detailed justification for using both of these procedures is contained in Kaine et al. (1994). Finally, the consistency of the scales used in the study to measure concepts such as mastery, innovativeness and stress was tested using reliability analysis (Carmines and Zeller 1979).

The statistical programs used to conduct the analysis were SPSS version 4 (SPSS Inc, 1988) and Clustan edition 4 (Wishart 1987).
Results/Findings

Sample characteristics

Surveys were distributed to 3039 addresses. A total of 783 mixed enterprise producers responded to the survey giving a response rate between 27 and 32 per cent after allowing for surveys that were incorrectly addressed or were sent to producers that did not manage a livestock or grain enterprise.

The average size of farms in the sample was 2,700 hectares with approximately 500 hectares being cropped. The average herd size was 300 cattle and the average flock size was 2,500 sheep. When compared with national statistics, the farms in our sample were larger than average for the wheat-sheep zone and had correspondingly higher than average livestock numbers.

The age of respondents varied between 20 and 89 years. The average age of respondents was 54 years, which matches the average age of farmers reported in national statistics. Most respondents had some form of formal secondary education. Approximately 25 per cent had undertaken a course at a TAFE, technical or agricultural college while 16 per cent had attended university or a college of advanced education. Overall, approximately 31 per cent of farmers in the sample had completed some form of post-school study. These results are similar to those reported in the Australian literature.

The results reported here are cross tabulations or ANOVAs. Where results are reported as significant it is at five per cent. Detailed statistical results are available from the authors on request.

Control and mastery

Mastery is the extent to which people feel they can change their situation by influencing the environment around them. This personality trait was measured in the survey using the 'sense of mastery' scale developed by Pearlin and Schooler (1978). This scale consists of seven statements about the extent to which a person believes they can influence events in their lives and the circumstances in which they live. Responses to the scale were coded such that higher scores corresponded to a greater sense of mastery. To assist interpretation scores on the scale were standardised. The scale exhibited a high degree of internal consistency indicating the scale was a reliable indicator of producers’ perceptions of control over their environment (Carmines and Zeller 1979).

We found evidence of a significant, though small, negative correlation between mastery and the age of producers. We also found that producers with higher levels of formal education reported a greater sense of mastery. In particular, producers who had not received a secondary school education reported levels of mastery that were significantly lower than average. On the other hand, producers with some tertiary education reported significantly higher than average levels of mastery.
The relationships between mastery, age and education are mainly thought to reflect differences in the life experiences and socialisation of people from different age cohorts. Aging and formal education are not thought to have a direct effect on mastery and locus of control (Schieman 2001).

Producers’ perception of control over the performance of their farm business was measured using an instrument developed by Kaine et al. (1994). This instrument consists of 27 paired statements describing perceptions of influence over production outcomes, financial outcomes, business expansion and growth. Responses to the instrument were coded such that high scores corresponded to an internal locus while low scores corresponded to an external locus.

Kaine et al. (1994) found that the majority of producers expressed an internal locus with respect to control over farm production but the perceptions of control over farm business performance varied. They identified four dimensions underlying producers’ perceptions of control over their farm business. They argued that, as these dimensions were correlated, they were components of a single, higher order dimension that reflected producers’ personality predisposition in terms of locus of control. Theoretically, this higher order dimension should be correlated with producers’ sense of mastery. This proposition was tested as follows. A second order factor analysis was conducted using producers’ scores on the planning dimension, enterprise mix, control over costs and enterprise expansion factors. The four factors collapsed into a single, second order factor we termed a generalised locus of control. We found that producers’ scores on this generalised locus of control factor were, in fact, highly correlated with their scores on the mastery scale. This result suggests that traits such as locus of control and sense of mastery are key determinants of producers’ perceptions of control over farm business performance.

We found evidence of a significant negative correlation between the age of producers and their generalised locus of control scores. We also found that producers with higher levels of formal education reported a greater sense of internal locus of control. In particular, producers who had not received a secondary school education reported levels of internal locus of control that were significantly lower than average. On the other hand, producers with some tertiary education reported significantly higher than average levels of internal locus of control.

Note that, as was the case with producers’ sense of mastery, the relationships between generalised locus of control and age and education are mainly thought to reflect differences in the life experiences and socialisation of people from different age cohorts (Schieman 2001).

Control, strategy and performance

Kaine et al. (1994) classified producers into one of three broad strategic types using seven pairs of locus of control statements that they identified on theoretical grounds as defining the key elements that determine control over farm business performance. These statements described producers’ perceptions of influence over production outcomes, financial outcomes,
business expansion and growth. They used the terms ‘prospectors’, ‘analysers’ and ‘defenders’ after Miles and Snow (1978) to describe the three strategic types they identified.

Prospectors are producers who believe they can influence the performance of their farm business through planning. They believe they can boost performance by constantly revising plans and adjusting enterprise mix. These producers report a high degree of control over most aspects of the farm business.

Analysers are producers who believe they can influence the performance of their farm business through planning. However, they believe that product prices are so unpredictable the constant revision of plans and adjustment of enterprise mix is self-defeating. These producers are more cautious than prospectors. They prefer to operate from a stable platform in terms of farm resource allocation and enterprise mix. These producers report a reasonable degree of control over most aspects of the farm business.

Defenders are producers who report a reasonable degree of control over farm production but believe the financial performance of their farm business is largely determined by external environmental factors. Hence, they believe the return on planning is very limited. These producers are more cautious than either prospectors or analysers. They prefer to operate from a very stable platform in terms of farm resource allocation and enterprise mix, making only marginal adjustments in response to market signals.

The profiles we found after analysing our data were not significantly different from those reported by Kaine et al. (1994). This result suggests that the strategic types they originally identified, namely prospectors, analysers and defenders, are present across different samples of producers.

Kaine et al. (1994) expected that the financial performance of producers that followed an analyser strategy should be superior to producers that followed a prospector or defender strategy. This prediction was supported by their analysis of self-reported farm equity. We did not find statistically significant differences in the proportion of producers in each equity category across the strategic types in this study. However, we did find other evidence to suggest that producers following an analyser strategy reported performance superior to producers following either a prospector or defender strategy.

We found that the proportion of producers who were changing enterprise mix, expanding their farming operation, winding back their farming operation, or developing their properties was significantly different across the different farm strategy types. A relatively high proportion of producers who followed a prospector strategy were changing enterprise mix, developing their properties and expanding farming operations. Although a relatively high proportion of these producers have invested off-farm, relatively high proportions of these producers also had to postpone major household purchases or medical care and change shopping patterns to save money.
Like prospectors, a relatively high proportion of producers who followed an analyser strategy were developing their properties, expanding farming operations and had invested money off-farm. Unlike prospectors only a relatively low proportion of producers following an analyser strategy had needed to postpone major household purchases or medical care, change food shopping patterns or borrow to meet family expenses.

A relatively high proportion of producers who followed a defender strategy were planning to wind back farming operations, were likely to have postponed major household purchases and medical care, changed food shopping patterns to save money and sold possessions or cashed in insurance to improve their cash position. A relatively small proportion of these producers had invested money off-farm.

**Implications**

We have identified statistically significant relationships among producers’ locus of control and their farm business performance.

In summary we found that producers with a strongly internal locus of control were:
- More likely than other producers to adopt a prospective farm strategy.
- Less likely than other producers to experience low financial performance.

Conversely we found that producers with a strongly external locus of control were:
- More likely than other producers to adopt a defensive farm strategy.
- More likely than other producers to experience low financial performance.

The findings raise two key implications for the design of extension programs.

1. Those producers most in need of upgrading their business skills may be the least likely to take advantage of extension programs offering such training.

The findings of this research indicate that primary producers with a strongly external locus of control are more likely to experience low financial performance than are producers with a more internal locus of control.

Previous studies have shown that individuals with an external locus of control tend to attribute poor performance to factors outside their control (Rotter 1966, McNairn and Mitchell 1992). This suggests that producers with an external locus of control will tend to believe the financial performance of their farming operation is largely determined by factors beyond their control. If these producers do not believe that they can exert control over the financial performance of their farming operations, they are unlikely to be receptive to extension programs aimed at improving the business skills of producers.

Previous studies have also shown that individuals with an external locus of control have difficulty emulating role models (Gist 1989). This suggests that, as well as being strongly sceptical of new business management practices, producers with a strongly external locus of
control will have difficulty translating information about new business management practices into information that they can apply to their particular farming and business operations.

These findings highlight a need for targeting extension programs aimed at improving business skills to those producers likely to be in most need of these programs, producers with a strongly external locus of control. For instance, there may be an opportunity to target these producers through the financial networks that service agricultural industries.

The findings of this research indicate that a relatively high proportion of these producers will experience poor financial outcomes in the long term. This provides an opportunity to identify such producers through their contact with the commercial banking system or the rural counselling network. Hence, one possibility for targeting assistance to producers with an external locus of control would be to provide commercial banks, rural trading businesses and rural counsellors with information on relevant extension programs that they may recommend to their clients.

Rural health services might also be used to target producers with an external locus of control. There is a strong possibility that producers who experience chronic stress associated with severe financial difficulties may contact a health professional. Hence, a second possibility for targeting assistance to these producers is to provide health professionals in rural areas with information on relevant extension programs, which they might then recommend.

Also, activities designed to change producers’ locus of control could be offered as part of a package of activities within a stress management program designed specifically for primary producers. Stress management and related programs typically involve activities designed to raise self-awareness and assertiveness, and to improve time management, and promote relaxation skills. Activities designed to increase the internality of producers’ locus of control should, in principle, complement these activities (Fontana 1994). Producers could also be referred to such programs through the commercial banking system and the rural counselling network.

An opportunity to target producers with an external locus of control might also be built on their tendency to express an internal locus of control in relation to production oriented activities. Producers who participated in this study tended to express perceptions of high control over farm production activities, even those producers who expressed an external locus of control. This suggests that these producers are likely to be receptive to extension activities that focus on the production aspects of farm management. Hence, it may be possible to target assistance to producers with an external locus of control through extension programs that integrate activities designed to increase the internality of their locus of control with activities that promote new agricultural practices.

Further research is required to design such integrated programs and to identify promotional messages that would be most effective in attracting producers with an external locus of control to these programs.
2. The inclusion of activities aimed at increasing the internality of producers’ locus of control is likely to increase the adoption of new skills and ideas among primary producers.

The findings suggest that a first step in the adoption process for producers with an external locus of control will be establishing a belief that they can exert control over outcomes associated with the new ideas and techniques demonstrated at extension events. We believe that if this first step is not made then efforts to promote the adoption of new skills and ideas to these producers will meet with limited success.

Research has shown how it is possible to increase the internality of people’s locus of control using techniques such as skills instruction, feedback, modelling behaviour rehearsal, social reinforcement and experiential education in various combinations. Adventure programs are an example of this. A variety of techniques have been used in these programs depending on circumstances and the issue at hand.

Some behaviour modification programs rely, for example, on a mix of modelling and behaviour rehearsal activities. Modelling and behaviour rehearsal involves the performance of relevant behavioural role-play scenes. Participants receive instructions on alternative ways of behaving in each scene, rehearse scenes with other participants, observe group leaders modelling appropriate behaviour for each scene and receive feedback from the group leader and other participants on their performance. Participants may be given social reinforcement contingent on the appropriateness of their behaviour (Ollendick and Hersen 1979).

Other techniques, such as experiential learning use more formalised techniques such as structured exercises undertaken in a workshop format led by a facilitator (Hall et al. 1997). The experiential learning approach is designed to encourage participants to reflect on their experiences, to identify areas requiring development and the formulation and implementation of development strategies. The exercises may include the exploration of real interactions between participants, role playing, drawing and verbal activities (Hall et al. 1997).

Modelling, behaviour rehearsal and experiential learning build competency and self-confidence in participants by assisting them to consciously and explicitly develop new ways to manage situations they experience that challenge them. Adventure education programs, in contrast, build competency and self-confidence in participants by placing them in challenging situations that are often entirely new to the participant.

Adventure education programs involve small groups in wilderness settings undertaking a variety of mentally and/or physically challenging tasks that involve frequent interactions and decision making. Adventure education programs have been found to improve self-concept, locus of control, independence, decision-making and stress in participants. These effects appear to strengthen over time following completion of the program (Hattie et al. 1997). Adventure education often forms a key component of leadership training programs (Conger 1992).
In our view, a suite of extension activities based on techniques such as modelling, behaviour rehearsal and experiential learning, and programs such as adventure education could be developed specifically to assist primary producers. Different activities would suit different producers depending on the relative internality of their locus of control. In principle, some of these activities could be integrated into existing extension programs.

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