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ARGYRIS AND ASSOCIATES' ORIENTATIONS TOWARDS LEARNING COLLECTIVELY: CAN IT BE MEASURED THROUGH SELF REPORTS?

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OPSOMMING

Die doel van hierdie studie was om die lewensvatbaarheid daarvan te ondersoek om interaksionele oriëntasies ten opsigte van kollektiewe leer deur middel van 'n selfverslaggewende instrument te meet. 'n Meetinstrument gegrond op die teoretiese raamwerk van Argyris en genote is gekonstrueer en aan statistiese ontleding onderwerp. 317 nagraadse studente in die fakulteit Ekonomiese en Bestuurswetenskappe aan die Randse Afrikaanse Universiteit het die vraelys voltooi. 'n Faktorontleding het vier tweede-orde faktore opgelewer. Die resultate van die studie blyk statistiese steun aan die aard van die mees algemene interaksionele strategieë, soos beskryf in die literatuur, te lewer. Die implikasies van hierdie bevindinge word bespreek.

ABSTRACT

The purpose of this study was to investigate the feasibility of measuring interactional orientations towards learning collectively by means of a self report instrument. Based on the theoretical framework of Argyris and associates, a measuring instrument was constructed and subjected to statistical analysis. 317 post graduate students in the faculty of Economic and Management Sciences at the Rand Afrikaans University completed the inventory. A factor analysis yielded four second-order factors. The results of the study appear to lend statistical support to the nature of the most prevalent interactional strategies described in the literature. The implications of these findings are discussed.

The centrality of interactional competence in facilitating skillful collective action is reflected in the literature related to organising and specifically to organisational learning. Swieringa and Wierdsma (1992), for example, have stated that collective competence is determined by the interactional competence of individuals. Interaction and specifically conversation may be regarded as the vehicle through which cognitive images of individuals functioning in a collective context are created and changed (Hosking and Morley, 1992); through which collective thinking skills can be developed to address the assumptions and patterns of behaviour underlying collective action; through which changes in thinking can be effected (Senge, Roberts, Ross, Smith and Kleiner 1994; Swieringa and Wierdsma 1992); through which joint reflection and inquiry into issues of mutual concern take place (Bushe and Shani, 1991); and through which the reasoning and assumptions of individuals – in their capacity as organisational agents – can be made explicit and tested publicly (Argyris and Schön 1978, 1996).

By engaging collectively in such sense-making activities as the aforegoing, individuals are considered to construct the collective cognitions which firstly enables them to create shared understandings of their contexts and secondly enables them to undertake joint actions on the basis of those understadings (Hosking and Morley, 1992). When the actions taken, do not produce the intended consequences these socially interactive processes – when performed competently – allow for the identification of errors in the reasoning which produced the actions in the first place, on the basis of which such actions can be corrected and redesigned (Argyris and Schön, 1978). Such collective change in the actions of persons acting on behalf of organisations, reflects the collective equivalent of individual learning – namely a change in behaviour as a result of experience (Hergenhahn, 1982) – and is generally referred to as collective learning (Swieringa and Wierdsma, 1992) or organisational learning (Argyris and Schön, 1978, 1996). According to Argyris and Schön organisational learning encompasses various levels of learning ranging from individual to organisational, supra-individual levels. At the individual level it can be conceived of as taking place through the face-to-face reasoning and actions of individuals working together in their capacities as organisational agents. The consequences of such individual interaction are considered to set in motion broader learning consequences for the larger social system, eventually resulting in systemic behavioural patterns, such as intergroup conflict and organisational defence routines (Argyris 1990a, 1993, 1996) that tend to become self perpetuating once they have been set in motion. In this article the focus is placed on the interactional aspects of organisational learning. The term collective learning will be used to refer to the learning that takes place during face-to-face interactions between members of a group in order to distinguish it from the broader term, organisational learning, which includes larger systemic elements. Argyris and Schön have drawn attention to two broad orientations towards such joint learning, namely a defensive orientation which inhibits learning and a productive orientation which facilitates it. The question as to whether it is possible to measure the orientation of an individual towards either defensive or productive learning, in a collective context by means of a self-report inventory, represented the focus of the research undertaken. The study was based on the theoretical framework provided by Argyris and Schön (1978, 1996), bearing in mind that self-report questionnaires are specifically regarded as inadequate by Argyris (1990a) in obtaining insight into behaviour and reasoning related to organisational learning. In order to explain the rationale of the study, a brief overview of the theoretical framework developed by Argyris and Schön is provided first, after which some of the methodological issues and controversies that arise from an attempt to measure such behaviour through a self-report instrument are highlighted.

In this theoretical framework specific attention is devoted to overcoming the negative consequences for learning that invariably result from tendencies on behalf of organisational members to protect themselves and others from perceived threat and embarassment during inquiry into the issues that underlie problems related to their joint functioning. Such actions are considered to serve the function of preventing the discussion of issues that cause problems so that the sources of problems remain undiscussable and therefore uncorrectable. In order to address such counterproductive interpersonal dynamics, development of interactional competence is considered

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necessary to make discussable what previously has been considered undiscussable.

With the fundamental assumption that human behaviour is caused and governed by multiple underlying forces as a point of departure (Argyris, 1982), Argyris, Schön and their co-researchers have focussed on how actions are designed to achieve desired consequences-based on the premise that behind every major action there is a process of reasoning, despite the appearance that such action may have been automatic and spontaneous. Human beings are considered to strive to produce intended consequences through their actions and to correct mismatches between intentions and outcomes. When a mismatch between intentions and outcomes occurs, it presents the opportunity for learning. Such learning may take place in the form of single-loop or double-loop learning.

Single-loop learning takes place when errors are corrected and detected without questioning or changing the underlying values of the system – be it at individual, group, intergroup, organisational or interorganisational levels. Double-loop learning takes place when the correction takes place by first examining and changing the governing variables and then the actions (Argyris, 1982, 1990b). This is illustrated in Figure 1 below.

Both single- and double-loop learning are considered necessary for organisations. Single-loop learning is regarded to be appropriate for routine, programmable situations. Double-loop learning on the other hand is considered more relevant for more complex, non-programmable and by implication more ambiguous, unpredictable situations which are subject to change. While double-loop learning is considered to be the more powerful of the two types of learning, it also requires more effort and is considered more difficult to accomplish. In this regard Argyris has pointed out that, paradoxically, the reasoning and skills used as well as the conditions created for double-loop learning typically are counterproductive for that purpose. Situations requiring double-loop learning are characterised by the risk of embarassment or threat to those involved as the questioning of the existing values and norms may shake the very foundations of the existing social order. Based on their research Argyris, Putnam and Smith (1985) have found that when dealing with threatening issues, people act in ways that inhibit the generation of valid information which gives rise to escalating patterns of error and which are self-sealing in the sense that inquiry into the governing variables causing the error is prevented by defensive, protective behaviour. In addition, the patterns maintaining such behaviour are treated as undiscussable and covered up because admission that one is embarking on such behaviour in the process of executing it, implies that one openly admits to undermining the principles of managerial stewardship and efficient problem solving (Argyris, 1993). Because of the threat and embarassment that would result in publicly admitting that one is covering up one's intentions, such cover up is also covered up on an iterative basis resulting in successive layers of defenses which prevents double-loop inquiry (Argyris et al., 1985). This results in the paradoxical situation that the very conditions requiring double-loop learning actually prevents it. In view of the point of departure that all actions whether it be explicit or tacit are designed, the defensive behaviour which prevents double-loop learning from taking place has led to the notion of designed incompetence – that is, the skillful production and design of counterproductive, unintended consequences (Argyris, 1990a).

The actions that people design, in turn, are considered to be based on generic strategies or theories about how to effect such action. These are labelled theories of action and function metaphorically like the master or executive programmes in a computer and according to which action in a situation is designed and produced. Two types of theories of action can be distinguished, namely, espoused theories and theories-in-use. *Espoused theories* refer to the explanations used to explain or justify actions. A common finding that has been reported is that people do not act congruently with their espoused theories when dealing with difficult and threatening situations (Argyris and Schön, 1978; Argyris, 1982). In order to understand the underlying rationale of actions and to have a basis for changing counterproductive actions, it is considered necessary to examine and make explicit the theories of action employed by people when designing their actions – that is, their *theories-in-use* – as opposed to what they espouse. To identify them, such theories-in-use must be inferred based on the observation of patterns of interaction between organisational members. An additional feature of these theories-of-action is that they are considered to be learnt early in life through socialisation processes and are supported by features of societal and organisational cultures (Argyris and Schön, 1996).

Two generic theories-in-use have been advanced by Argyris and Schön (1978, 1996), labelled Model 1 and Model 2 respectively. In conducting research with regard to these theories-in-use, their findings have indicated that the reasoning and action of almost all people – regardless of race, gender, age, economic or educational status – when confronted with potentially embarassing or threatening situations, conform to the Model 1 theory-in-use. Similar findings in North America, South America, Europe, Africa and the Far East have been reported (Argyris and Schön, 1996; Argyris, 1993). The procedures used to demonstrate this are documented elsewhere (Argyris, 1982; Argyris et al., 1985).

These generic theories-in-use may be decribed in terms of their governing variables, strategies for action and their consequences for learning. The governing variables of Model 1 comprise the following: (1) define goals and try to achieve them; (2) maximise winning and minimise losing; (3) minimise generating or expressing negative feelings; and (4) emphasize rationality. The primary behavioural strategies accompanying these governing variables are to control the relevant environment and tasks unilaterally and to protect oneself and others unilaterally, the common demoninator being unilateral, defensive control. The consequences for the behavioural world created by Model 1 strategies include defensive interpersonal and group relationships, low freedom of choice and reduced production of valid information. Negative consequences for learning follow as a result of the defensive reasoning that characterises this model.

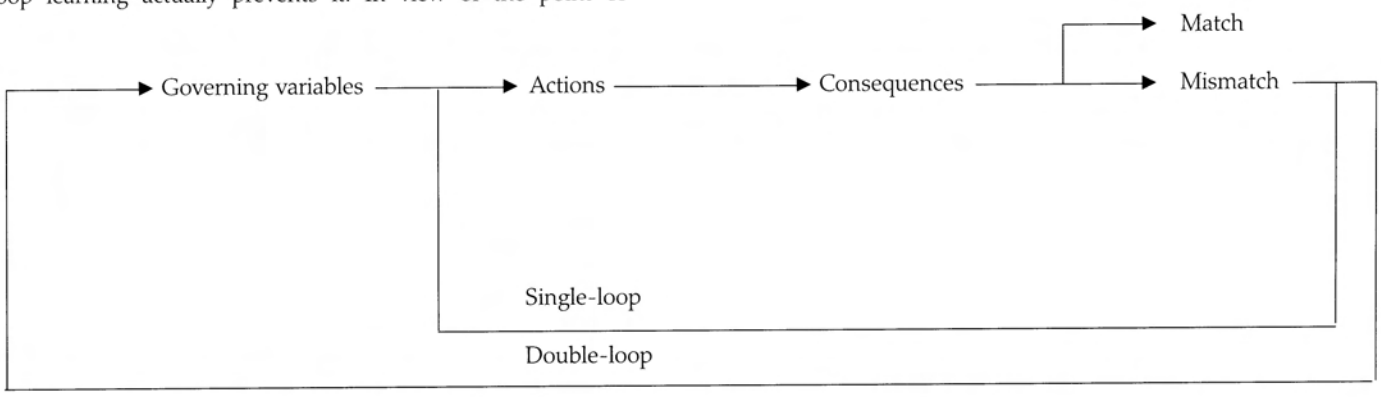

Figure 1: Single-loop and double-loop learning (adapted from Argyris, 1990b).

This includes keeping private the inferences, premises and assumptions underlying espoused views, withholding of feelings, little public testing of conclusions and face-saving behaviour in the service of protection. The learning that does occur takes place within the bounds that are acceptable with the result that double-loop learning does not tend to occur. The dilemma involved in Model 1 behaviour is that for it to be implemented effectively, the recipients must be willing to accept being submissive, passive and dependent – the paradox being that implementation of this type of behaviour requires others to be ineffective. As people generally resist such authoritarian, unilateral actions through similar, defensive strategies, attempts to out-maneuver one another, games of deception, camouflage and distortion of intentions invariably occur (Argyris, 1990a). Argyris and his colleagues have reported that most people will espouse theories inconsistent with Model 1 but are unable to produce actions that do not fit the model, even when they have been exposed to the conceptual underpinnings of it. They report that, at best, people appear to be able to produce actions that reflect the mirror image of Model 1 – called Opposite Model 1 – but which in essence contains the elements of Model 1 in an indirect way. The governing variables of Opposite Model 1 include: (1) participation of everyone in defining purposes; (2) everyone wins, no one loses; (3) express feelings; and (4) suppress the cognitive intellective aspects of action. The behavioural strategies associated with these governing variables include emphasizing inquiry and minimising unilateral control. The unilateral protective and defensive nature of this model is considered to result in similar consequences for learning and effectiveness than the more overt variety of Model 1 (Argyris, et al., 1985).

Model 2 theory-in-use facilitates double-loop learning. It is normative in the sense that it presents an alternative that is possible, but the practice of which is considered to be rare. The governing variables of Model 2 include the following: (1) valid information; (2) free and informed choice; and (3) internal commitment. The behavioural strategies accompanying these variables involve the sharing of control with those who have the most competence for the decision to be made and who participate in the design and implementation of action. Instead of the unilateral advocacy of views or inquiry that conceals the agent's own views, which is characteristic of Model 1 behaviour, advocacy and inquiry are combined. According to Argyris and Schön (1996) *Model 2 does not reject the skill or competence to advocate one's purposes. It does reject the unilateral control that usually accompanies advocacy because the typical purpose of advocacy is to win. Model 2 couples articulateness and advocacy with an invitation to others to confront the views and emotions of self and others. It seeks to alter views in order to base them on the most complete and valid information possible and to construct positions to which people involved can become internally committed. This means that the actor in Model 2 is skilled at inviting double-loop learning on the part of other individuals* (p. 117). Model 2 is characterised by productive reasoning, which involves a combination of advocacy and inquiry. It involves making explicit the reasoning and assumptions underlying expressed views, making all inferences explicit, inviting public testing of such views and crafting conclusions in such ways that allow others the opportunity to attempt to disconfirm them (Argyris, 1990a).

According to Argyris and Schön (1996), it appears to be a universal phenomenon that people are not able to naturally produce the productive reasoning that accompanies Model 2 assumptions and as such experience difficulty in avoiding the defense-producing consequences of Model 1 behaviour. In this regard the hypothesis has been put forward that Model 1 behaviour is held in place and reinforced by Model 1 assumptions of what it means to behave virtuously in social situations through early socialisation processes (Argyris, 1993, 1990a). Different understandings of what it means to behave virtuously in social situations underlie the Model 2 theory in

TABLE 1
MODEL 1 INTERPRETATIONS OF SOCIAL VIRTUES VERSUS MODEL II INTERPRETATIONS (adapted from Argyris, 1990a).

MODEL 1 SOCIAL VIRTUES	
Help and support	
Give approval and praise to others. Tell others what you believe will make them feel good about themselves. Reduce their feelings of hurt by telling them how much you care, and if possible, agree with them that the others acted improperly.	Increase others' capacity to confront their own ideas, to create a window into their own mind, and to face their unsurfaced assumptions, biases and fears by acting in these ways toward other people.
Respect for others	
Defer to other people and do not confront their reasoning or actions	Attribute to other people a high capacity for self-reflection and self-examination without becoming so upset that they lose their effectiveness and their sense of self-responsibility and choice. Keep testing this attribution opening.
Strength	
Advocate your position in order to win. Hold your own position in the face of advocacy. Feeling vulnerable is a sign of weakness.	Advocate your position and combine it with inquiry and self-reflection. Feeling vulnerable while encouraging inquiry is a sign of strength.
Honesty	
Tell other people no lies, or tell others all you think and feel.	Encourage yourself and others to say what they know, yet fear to say. Minimise what would otherwise be subject to distortion and cover-up of the distortion.
Integrity	
Stick to your principles, values and beliefs	Advocate your principles, values and beliefs in a way that invites inquiry into them and encourages other people to do the same.

attached to the social virtues of helping and supporting others, showing respect for others, strength, honesty and integrity according to Model 1 and Model 2 are indicated in Table 1.

In order to produce the Model 2 behaviour that is necessary for double-loop learning, a strong emphasis is placed on the crafting of conversations that in effect allows people to reason together through making public their premises and inferences and devising tests to test the vadility of such reasoning. The typical style of conversation conducted by an individual may, by implication, be considered to result from an interplay between reasoning processes, strategies of influence and perceptions of socially appropriate behaviour. A contribution that demonstrates this, is that of McClain Smith (in Senge et al., 1994). Based on the theoretical framework of Argyris and Schön, McClain Smith has developed the advocacy-inquiry matrix which reflects an example of a taxonomy of conversational styles resulting from various combinations of advocacy and inquiry. The matrix is reproduced below in Figure 2 indicating a number of the patterns of conversation relevant to collective learning.

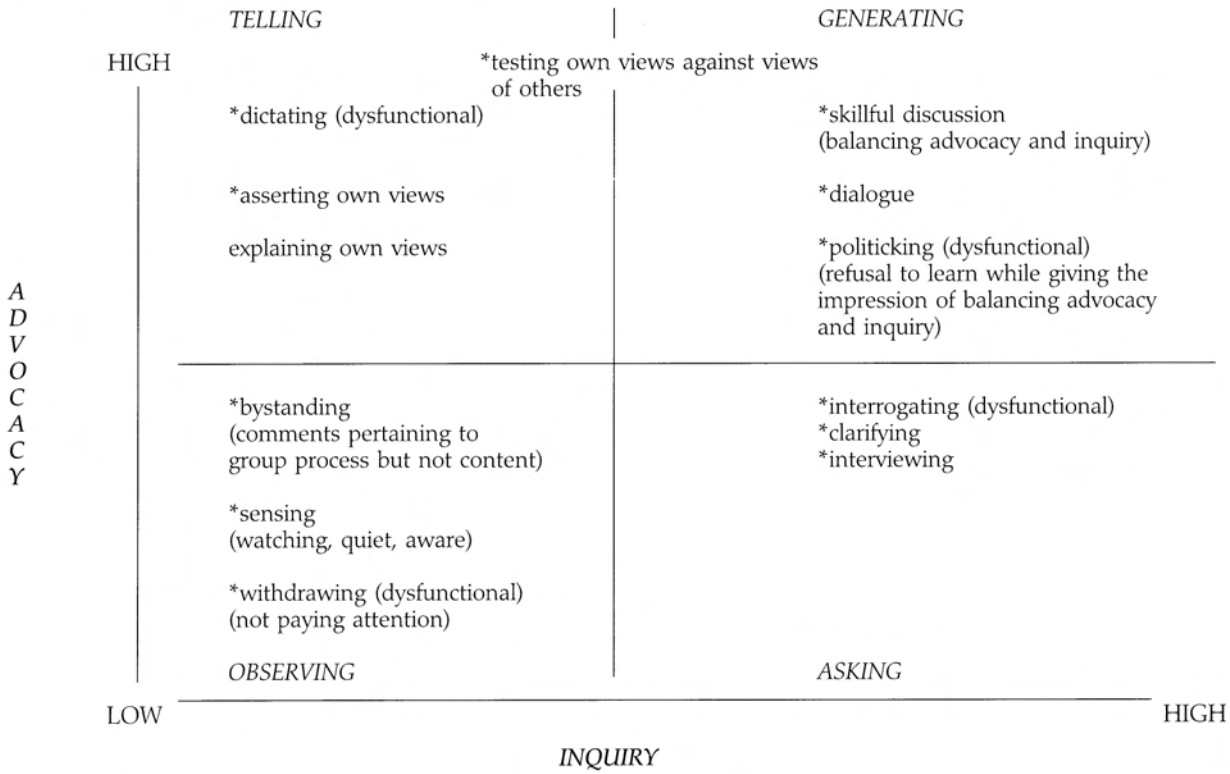

Figure 2: The advocacy-inquiry matrix (adapted from Senge, et al., 1985).

From the matrix it can be seen, for example, that, although the risk of abuse through politicking exists, the *generating* style would be regarded as the ideal style to facilitate double-loop learning as it involves high levels of both advocacy and inquiry. The other styles while involving some functional elements which may be useful for single-loop learning, predominantly reflect examples of defensive-protective conversational behaviour which are considered to inhibit double-loop learning. The styles indicated in the matrix are however not regarded as an exhaustive list of conversational styles (Ross, in Senge et al., 1994) and for example does not include the protective face-saving behaviour identified by Argyris et al (1985). In describing conversational strategies related to the defensive-protective orientation, Argyris et al list the following as the most prevalent in this category: withdrawing, keeping reactions private, making face-saving moves, and asserting reactions unilaterally. In contrast, the productive reflective strategies are considered to comprise of public reasoning, initiating alternative lines of inquiry and public reflection, with the overarching characteristic being the combination of advocacy and inquiry.

The theoretical framework outlined above includes constructs ranging from high levels of abstraction (theories-of-action) to relatively observable behaviour (conversational styles). In Table 2 the various constructs related to collective learning, as conceptualised by Argyris and Schön, reflecting the two broad orientations to learning, are depicted at increasing levels of abstraction in order to facilitate an understanding of how they may be related to one another and to clearly indicate the nature of the behavioural domain considered relevant for the construction of the measuring instrument.

In investigating the feasibility of measuring orientations toward collective learning, a number of factors were considered that represent strong arguments against direct inquiry into it through the method of a self-report inventory, particularly as defense mechanisms appear to be activated in situations requiring double-loop learning. The first of these relates to the contention that rigorous methodology as practiced in the course of normal science – such as surveys and questionnaires – collects information about what people say they do (espoused theories), rather than what they actually do (theories-in-use) (Argyris, 1990a). According to Argyris and Schön, theories-in-use, not espoused theories, must be investigated to establish the nature of collective learning behaviour. It therefore follows that inquiry into the actual theory-in-use (for example, Model 1 vs Model 2) of a person is not considered feasible using methods collecting data about espoused theories.

The second consideration relates to the argument that in order to assess behaviour where the presence of defense mechanisms is likely, it is desireable to use methods that allow thought processes to be revealed in an unhampered and undirected fashion and for which no stereotyped response is readily available. Given the complex nature of thought processes involving defense mechanisms, it is considered that they are more likely to be revealed in extensive examples of verbal behaviour, rather than single word responses (Cramer, 1987) as would be the case in the selection of a single response alternative in an inventory. The third consideration relates to the actual behavioural domain that would have to be sampled for the construction of a measuring instrument. Given the reported finding that in 99% of cases research participants have

TABLE 2
SUMMARY OF COLLECTIVE LEARNING CONSTRUCTS AT VARYING LEVELS OF ABSTRACTION

	LEARNING ORIENTATION	
	DEFENSIVE/PROTECTIVE	PRODUCTIVE/REFLECTIVE
Abstract ▲ LEVEL OF ABSTRACTION Concrete	Model 1 theory-of-action	Model 2 theory-of-action
	Defensive reasoning	Productive reasoning
	Protective interpretation of social virtues	Non-protective interpretation of social virtues
	Defensive/protective strategies of conversation **unilateral advocacy* **unilateral inquiry* **withdrawing* **face-saving actions*	Productive/reflective strategies of conversation **public reasoning* **public reflection* **combining advocacy and inquiry*

not been able to produce behaviour consistent with Model 2 governing variables without having learnt the specific skills required for it, it appears that the skills for double-loop learning does not occur naturally in the normal course of interaction. The sampling of behaviour pertaining to such specific interactional skills, which are considered to fall outside the behavioural repertoire of most people, would therefore not be feasible.

The fourth consideration pertains to the contention that the acceptable methods of social science are also characterised by Model 1 type strategies – such as unilateral control, and secrecy which by definition will result in defensive behaviour on the part of participants – for example by attempting to manipulate, consciously or sub-consciously, answers to the research questions. This implies that the very nature of administering a self-report inventory would trigger the same defensive behaviour that one is attempting to measure, posing serious threats to the validity of the information obtained. Not only does the risk of socially desireable responses provide threats to the validity of responses, but also the possibility that respondents may be totally unaware of their Model 1 defensive behaviour on the grounds that it has become highly internalised and automatic as a result of socialisation processes (Argyris, 1990a, c; Argyris and Schön, 1996). The above considerations may account for the fact that attempts to develop a self-report measuring instrument in this regard have not yet been reported.

Despite these reservations, a number of considerations would appear to justify an attempt to develop a scale for developing such an instrument. The first consideration relates to the issue of the lack of variance in the inability to demonstrate Model 2 behaviour without having learnt the specific skills involved in it. This would appear to imply that if, as has been shown, 99% of people are unable to demonstrate such behaviour, it would be a futile exercise to ask them if they did so. It should however be noted that although this lack of ability may exist, Argyris et al (1985) do describe different orientations (indicating different levels of readiness for learning) among people as they begin to learn the required skills for double-loop learning in an instructional situation – a situation which in itself contains the risk of embarassment or threat. They distinguish between those who adopt a protective stance and those who adopt a reflective, learning orientated stance. The protective stance is characterised by a fear of failure and interactional strategies of withdrawal, keeping reactions private, making face-saving moves and asserting reactions unilaterally – the typical Model 1 response. The reflective stance is characterised by a greater willingness to take risks and initiative for learning coupled with a greater degree of vulnerability. The interactional strategies include making reasoning public, initiating experiments and lines of inquiry and publicly reflecting on the reasoning of others – which appears to be similar to the description of Model 2 type behaviour. Persons who demonstrate such a reflective orientation are considered to have a greater chance of succeeding in learning to double-loop learn. Although these orientations have been identified in instructional settings it may reasonably be expected that they will also be present where organisational members confront problems requiring double-loop learning in the course of joint action. This conclusion is based on the reasoning that irrespective of whether it is an instructional or real life setting, it is the reaction to potential threat and embarassment that is the common denominator. The lack of variance observed in Model 1 behaviour therefore does not appear to result in a similar lack of variance in learning orientation so that an attempt to measure such orientations with the anticipation that differences will occur, appears to be reasonable.

The second consideration relates to the extensive level of development of the theory in that specific behaviours – conversational behaviour – are identified and linked to the different orientations. Such specific behaviour represents a well described behavioural domain, lending itself to sampling through the means of an inventory.

Thirdly, with regard to the feasibility of using a self-report instrument to measure behaviour where defense mechanisms are in operation, the observation of Vaillant (1993) would suggest that this may not be as unrealistic as it would appear at first sight. Vaillant has observed that defensive behaviour is not necessarily invisible to the user, but rather that the user is unlikely to recognise such behaviour as a defense. Given this premise, it may therefore be feasible to sample defensive behaviour without requiring of respondents to indicate whether they are using such behaviour deliberately in service of the protection of self and others. This strategy of data collection would however of necessity then have to be withheld from respondents. On the basis of the above reasoning it was decided not to inquire directly into the theories-in-use of respondents by requiring of them to indicate whether they employ defensive or non-defensive routines. Given the relatively clear descriptions of conversational behaviour linked to the different learning orientations it was decided to rather require of respondents to indicate how they typically interacted in situations where the risk of embarassment or threat was present. The premise was that such conversational behaviour would reveal the collective learning orientation of a person.

METHOD

The behavioural domain sampled in the inventory included descriptives of defensive versus productive learning behaviour as well as perceptions of socially appropriate behaviour as indicated in Table 1. The inventory consisted of 79 items where responses had to be indicated on a seven point scale.

Sample

A convenience sample of 317 post graduate students of diverse cultural backgrounds in the faculty of economic and management sciences at the Rand Afrikaans University completed the inventory. 52,4% of respondents were male, while 45,8% were female. With regard to the representation of different language groups in the sample, Afrikaans represented 36,9%, northern and southern Sotho together 15,1%, English 15,1%, Tswana 10,1%, Zulu 7,3%, Xhosa 6,6%, Venda 1,3%, Tsonga 1,3%, Pedi 0,3% and Shangaan 0,3%. The ages of respondents ranged from 19 to 60 years while the level of education ranged from standard 10, or the equivalent thereof, to post graduate. The details of the sample are indicated in Table 3.

TABLE 3
BIOGRAPHICAL DATA OF RESPONDENTS (n = 317)

1. GENDER	FREQUENCY	PERCENTAGE
Male	166	52,4
Female	145	45,8
No response	6	1,8
TOTAL	317	100
2. HOME LANGUAGE	**FREQUENCY**	**PERCENTAGE**
Afrikaans	117	36,9
English	48	15,1
Xhosa	21	6,6
Zulu	23	7,3
Northern Sotho	38	11,9
Southern Sotho	10	3,2
Venda	4	1,3
Tsonga	4	1,3
Pedi	1	0,3
Shangaan	1	0,3
Tswana	32	10,1
Other	6	1,9
No response	12	3,8
TOTAL	317	100
3. EDUCATION	**FREQUENCY**	**PERCENTAGE**
Std 10/equivalent	4	1,3
Diploma/certificate	31	9,8
Degree	191	60,4
Post Graduate	90	28,4
No response	1	0,1
TOTAL	317	100
4. AGE	**FREQUENCY**	**PERCENTAGE**
<20	1	0,3
20-29	171	54,0
30-39	106	33,4
40-49	33	10,5
50+	3	0,9
No response	3	0,9
TOTAL	317	100
Mean age = 28		

Statistical Analyses

A *factor analysis* using the BMDP programme according to the procedure developed by Schepers (1992) was carried out. A first-order factor analysis was performed where factors were extracted on the basis of Kaiser's criterion. Subscores were determined for each factor. These scores were then intercorrelated and subjected to a second-order factor analysis. The obtained factor matrix was rotated to simple structure and sorted using the Direct Oblimin procedure. An *item analysis* using the NP50 programme of the NIPR was carried out for each second-order factor. In order to determine whether the respondents in the sample could be classified according to their collective learning orientations, a *hierarchical cluster analysis* based on a method described by Friedman and Rubin (1967) was carried out. This procedure was programmed by the NIPR, and is known under the name of Clix. A cluster analysis is an explorative technique aimed at identifying the optimum amount of clusters of respondents with regard to the variables that are measured. This is achieved through an iterative process of re-classification of respondents, such that the variance within clusters are minimised and variance between clusters are maximised. Being a hierarchical technique, the analysis typically yields different options in terms of the number of clusters that can be identified. The choice of the best number of clusters, however, needs to be determined by inspection (Van Schalkwyk and Schepers, 1991).

RESULTS

23 factors were extracted from the first-order analysis. Given the magnitude of it (79 x 79) the intercorrelation matrix of the 79 items is not reproduced here. Subscores were determined for each of the 23 factors. These scores were intercorrelated and subjected to a second-order factor analysis. The intercorrelation matrix of subscores of the 23 first-order factors (23 x 23) was also considered too large to reproduce here. The obtained factor matrix was rotated to simple structure and sorted (Table 4) yielding four second-order factors. The intercorrelation matrix of the rotated factors is produced in Table 5. With the exception of a 0,336 correlation between factors 1 and 3, low correlations were found between the order factors. For each of the factors Cronbach Alpha reliability coefficients were computed, as well as reliability indices for each item.

TABLE 4
SORTED ROTATED FACTOR MATRIX

		FACTOR1 1	FACTOR2 2	FACTOR3 3	FACTOR4 4
FACT3	92	**0,670**	0,000	0,000	0,000
FACT16	105	**0,618**	0,000	0,000	0,000
FACT18	107	**0,597**	0,000	0,000	0,000
FACT19	108	0,000	**0,568**	0,000	0,000
FACT1	90	0,532	**0,568**	0,000	0,000
FACT17	106	0,000	0,000	**0,766**	0,000
FACT10	99	0,000	0,297	0,000	**0,583**
FACT4	93	-0,341	0,000	0,000	**0,514**
FACT14	103	0,000	0,000	0,000	**-0,387**
FACT21	110	0,000	0,000	0,000	**0,383**
FACT24	112	0,291	0,000	0,000	**-0,300**
FACT2	91	**0,448**	0,000	0,000	0,000
FACT15	104	0,000	**-0,337**	0,000	0,000
FACT7	96	0,000	**0,464**	0,000	0,000
FACT6	95	0,266	0,000	**0,483**	0,000
FACT5	94	0,000	**0,459**	0,000	0,000
FACT13	102	0,000	0,000	**0,402**	0,000
FACT12	101	**0,408**	0,000	0,000	0,000
FACT9	98	**0,431**	0,000	0,275	0,000
FACT8	97	**0,452**	0,000	0,309	0,000
FACT11	100	0,000	0,000	**0,479**	0,000
FACT22	111	0,000	**0,304**	0,000	0,000
FACT20	109	0,000	0,000	0,000	0,000

TABLE 5
INTERCORRELATION MATRIX OF ROTATED FACTORS

		FACTOR1 1	FACTOR2 2	FACTOR3 3	FACTOR4 4
FACTOR1	1	1,000			
FACTOR2	2	-0,078	1,000		
FACTOR3	3	0,336	0,132	1,000	
FACTOR4	4	-0,197	0,144	0,064	1,000

TABLE 6
ITEM STATISTICS: FACTOR 1

Cronbach Alpha = 0,879

ITEM	DESCRIPTION	MEAN	STANDARD DEVIATION	RELIABILITY INDEX	ITEM-TEST CORR
Q3	make group members aware of their own fears towards a particular issue	4,517	1,424	,667	,469
Q4	enquire about the fears of others in the group concerning a particular issue	4,685	1,452	,629	,433
Q6	say or do things to make group members ?? of their own points of view	4,420	1,498	,658	,439
Q11	point out inconsistencies in the statements of group members in front of the group	4,050	1,614	,668	,414
Q12	ask questions about why group members are convinced of their own points of view	4,868	1,327	,660	,497
Q14	ask others to back up their statements/points of view with valid information	5,290	1,219	,658	,540
Q16	state that group members are biased in their points of view when you believe it to be the case	4,820	1,404	,667	,475
Q18	say or do things to make group members aware of their own biases towards an issue	4,836	1,287	,718	,558
Q20	point out inaccuracies in the statements of your fellow group members	4,782	1,312	,696	,531
Q45	encourage others to find inconsistencies in your own points of view	3,375	1,573	,717	,456
Q49	state your position in such a way that others are encouraged to question your reasons for holding a particular point of view	4,968	1,374	,643	,468
Q51	invite others to identify inaccuracies and biases in your own points of view	5,047	1,421	,659	,464
Q59	state the truth about an issue even if it may be upsetting to people	4,890	1,490	,751	,504
Q60	encourage others to say what they may be scared of saying	5,338	1,294	,727	,562
Q61	say what you think or feel even if you realised that there may be negative consequences for you if you did so	4,716	1,465	,790	,539
Q63	talk straight even if the truth could hurt someone	4,678	1,470	,756	,514
Q65	request those who may be afraid, to say what they know	5,028	1,346	,756	,561
Q67	listen for signs that group members may have knowledge which they are afraid to communicate	5,132	1,298	,693	,534
Q68	encourage others to voice their opinions even if it conflicts with the views of authority	5,328	1,290	,708	,549
Q70	ask others to explain why they believe in their principles and values	5,397	1,302	,651	,500
Q72	ask others to state their principles and values	5,401	1,180	,618	,524
Q75	state your principles in a way that encourages others to discuss them with you	5,297	1,263	,648	,513
Q77	explain to others why you believe in your principles and values	5,782	1,131	,509	,450
Q78	encourage others to question you own principles and values	4,987	1,621	,987	,609
Q79	encourage others to question their own principles and values	5,069	1,510	,878	,582

From an inspection of Table 6, it can be seen that Factor 1 (Cronbach Alpha = 0,879) relates to conversational behaviour aimed at a tough examination of issues confronting the group, involving explanations of how conclusions are arrived at as well as extending invitations for questioning stated views and opinions. This combination of advocacy and inquiry related behaviour would correspond to the *generating* style identified by McClain Smith and the *productive-reflective* conversational strategies described by Argyris et al (1985). Following the iterative procedure of the item analysis item 64 was omitted. The remaining 25 items all possess acceptable reliability indices ranging from 0,509 to 0,987.

An inspection of Table 7 indicates that Factor 2 (Cronbach Alpha = 0,809) relates to behaviour aimed at ensuring harmony and protection against embarassment and threat for members in the group. While this style does not feature in the advocacy-inquiry matrix of McClain Smith it does correspond to the protective form of defensive behaviour described by Argyris et al (1985), which is labelled *face saving* behaviour. Items 25 and 34 were omitted from this factor while the remaining 17 items possess adequate reliability indices ranging from 0,526 to 0,907.

TABLE 7
ITEM STATISTICS: FACTOR 2

Cronbach Alpha = 0,809

ITEM	DESCRIPTION	MEAN	STANDARD DEVIATION	RELIABILITY INDEX	ITEM-TEST CORR
Q2	do or say things to enhance the self esteem of your group members	5,167	1,256	,597	,476
Q5	do or say things to create friendly relationships among group members	5,798	1,132	,595	,526
Q7	avoid talking about topics which may upset others in the group	4,123	1,699	,617	,363
Q8	make a point of it to praise group members when the opportunity arises	5,754	1,264	,643	,508
Q10	value the importance of harmonious relationships in a work group	6,038	1,105	,526	,476
Q13	do or say things to make group members feel good about themselves	5,382	1,205	,697	,579
Q15	express or demonstrate that you care about group members if you feel they may have been hurt	5,530	1,231	,727	,591
Q17	believe it important that the group takes care not to hurt or embarass anybody in the group	5,416	1,325	,686	,518
Q19	demonstrate your sensitivity towards others by not raising points for discussion that in your opinion may hurt, embarass or threaten them	4,505	1,668	,702	,421
Q21	compliment group members or pass on compliments from others to the group	5,861	1,091	,601	,551
Q22	avoid getting into situations where group members may become hurt, embarassed or offended	4,842	1,654	,725	,438
Q23	take sides with group members who may have been hurt in order to reduce the amount of hurt they feel	4,132	1,607	,566	,352
Q26	assist group members who in your opinion have been embarassed to "save face"	4,830	1,435	,583	,406
Q28	do or say things to help group members feel better when they have been offended	5,416	1,146	,781	,681
Q30	agree with group members who may have been embarassed to make them feel better	3,609	1,700	,817	0,481
Q31	make supportive comments to reduce the amount of discomfort felt by group members	5,107	1,281	,907	,708
Q32	speak on behalf of group members who have been hurt to assist them in defending themselves	4,145	1,691	,748	,442

Table 8 indicates that Factor 3 (Cronbach Alpha = 0,761) involves the advocating of views and opinions without showing signs of vulnerability – closely corresponding to the defensive, *unilateral advocacy* described by Argyris et al (1985) and which is also reflected in the *telling style* of the advocacy-inquiry matrix. Items 9, 44 and 54 were omitted from this factor while the remaining 12 items yielded acceptable reliability indices ranging from 0,652 to 0,939.

An inspection of Table 9 shows that Factor 4 (Cronbach Alpha = 0,772) involves the withdrawal, avoidance-of-conflict type behaviour, listed by Argyris et al as another prevalent defensive-protective strategy and which corresponds to the *observing style* in the advocacy-inquiry matrix. Items 3 and 29 were omitted from this factor while the remaining 10 items yielded acceptable reliability indices, ranging between 0,692 and 1,0.

The results of the cluster analysis are indicated in Table 10. In order to facilitate the interpretation thereof, scores were transformed to a mean of 50 and a standard deviation of 10. After inspection of the different clusters a two cluster solution was judged to provide the most meaningful grouping of respondents. The judgement was based on the degree to which the clusters contrasted from one another in terms of the various factors, and in particular, Factor 4, as this factor may be regarded to correspond most to the productive/reflective orientation.

TABLE 8
ITEM STATISTICS: FACTOR 3

Cronbach Alpha = 0,761

ITEM	DESCRIPTION	MEAN	STANDARD DEVIATION	RELIABILITY INDEX	ITEM-TEST CORR
Q43	attempt to influence others to accept your point of view	5,060	1,389	,755	,543
Q47	evaluate your own statements critically while putting them across	5,366	1,343	,722	,538
Q48	state your position as persuasively as possible	5,470	1,431	,939	,657
Q50	stick to your position in the face of opposition	5,000	1,514	,827	,546
Q52	not show any signs of uncertainty about your own position	4,546	1,629	,876	,538
Q53	believe your position will be weakened if you show any signs of uncertainty about your own position	3,748	1,835	,744	,406
Q56	explain the basis on which you formed your opinion	5,577	1,195	,652	,546
Q57	stick to facts and logic in putting your views across	5,615	1,213	,677	,558
Q69	believe there are universal principles that cannot be questioned	4,233	1,745	,739	,423
Q71	persuade others to accept certain principles and values	4,593	1,578	,886	,562
Q73	believe one must not compromise one's principles and values	5,091	1,712	,895	,523
Q76	stick to your principles and values	5,650	1,212	,665	,548

TABLE 9
ITEM STATISTICS: FACTOR 4

Cronbach Alpha = 0,772

ITEM	DESCRIPTION	MEAN	STANDARD DEVIATION	RELIABILITY INDEX	ITEM-TEST CORR
Q35	leave it to someone else to express disagreement	3,397	1,725	1,003	,582
Q36	prefer to express disagreement in private	3,640	1,887	1,211	,642
Q37	feel comfortable in voicing disagreement	3,013	1,632	,881	,540
Q38	believe respect and dignity afforded people are undermined when their reasoning is confronted in a group setting	3,558	1,642	,896	,546
Q39	out of respect for others avoid questioning their views in front of the group	3,521	1,606	1,009	,628
Q42	believe people become touchy if you disagree with them in front of a group	4,451	1,588	,692	,436
Q46	agree with others for the sake of harmony in the group	2,773	1,601	1,045	,653
Q55	keep quiet rather than voice disagreement for the sake of the unity of the group	2,732	1,663	1,094	,657
Q62	believe that some things are better left unsaid	3,871	1,695	,781	,641
Q74	believe that principles and values are personal and should not be discussed in a group	3,073	1,610	,706	,439

TABLE 10
MEAN SCORES ON FACTORS 1 TO 4 IN RESPECT OF TWO CLUSTERS

CLUSTERS	MEANS					RESPONSE TYPE
	N	F1	F2	F3	F4	
1	173	55,917	53,844	55,766	48,170	A+, A, A+, A
2	144	42,892	45,382	43,071	52,199	A-, A-, A-, A

N = number of respondents in cluster
A = Average

An inspection of Table 10 shows that two more or less contrasting clusters of respondents could be identified in the sample. In cluster 1 the highest response pertained to Factor 1, while the opposite was true in cluster 2. The profile in cluster 1 may therefore suggest more of a productive orientation, while the profile of cluster 2 suggests more of a defensive orientation.

DISCUSSION

The results of the study appears to lend statistical support to the nature of the most prevalent conversational strategies as identified by Argyris et al (1985) and as depicted in the advocacy-inquiry matrix of McClain Smith (in Senge et al.,

1994). When compared to the strategies depicted in the advocacy-inquiry matrix, it would appear that the strategy of unilateral inquiry, (*asking* in the advocacy-inquiry matrix) has not been captured in the measuring instrument. As was mentioned earlier, face saving behaviour (Factor 2) is not reflected in the matrix, although it represents one of the important strategies of conversation mentioned by Argyris et al (1985).

With its adequate psychometric properties, and with the exception of unilateral inquiry strategies, the measuring instrument thus appears to provide an adequate identification of the prevalent conversational strategies relevant to collective learning. The incorporation of a scale to measure unilateral inquiry behaviour may represent the focus of a follow-up study. In interpreting the scores on the various factors, it appears that a higher response on Factor 1 in relation to the other factors, would suggest a productive orientation while the converse would indicate a defensive orientation. The results of the cluster analysis indicate that these two distinct orientations could tentatively be identified in the sample.

In view of the reservations with regard to the desireability of using a self-report instrument for measuring collective learning orientations, it is interesting to note how, despite these, a factor structure is obtained that so closely resembles the theoretical descriptions thereof. The emergence of four second-order factors would suggest that respondents consistently and systematically differentiated in their responses to items (Kerlinger, 1979), which would indicate a relative absence of random and acquiesence biases. In view of the different classes of responses revealed by the cluster analysis, the extent to which respondents may have attempted to give socially desireable responses is not readily apparent. In the event that this was the case, the different classes of responses would suggest that either different perceptions of socially desireable behaviour existed within the sample (which is possible, given the culturally diverse nature of it), or that the items were not sufficiently transparent to allow for systematic distortion in this regard. The extent to which the instrument lends itself to systematic social desireability responding may however be tested in a follow-up study.

Despite the consistency of responses as indicated by the statistical analyses, it is possible to argue that such consistency does not necessarily imply that responses were accurate. In this regard, it should be noted that Argyris has emphasized that people will readily espouse the productive orientation that accompanies Model 2 behaviour without acting accordingly. Respondents may thus in their responses consistently espouse behaviour compatible with the productive orientation without acting accordingly. If this were the case, it would imply that the most that could be expected from a self-report instrument is to identify those who espouse a productive orientation. This would however leave the issue of how to interpret the responses of those who espouse a defensive orientation, as well as the question of whether this would not be a worthwhile end in itself. The settlement of this issue lies at the crux of the debate presented in this article, but is considered to fall outside the scope of the present study as it points to the necessity of obtaining critertion information for conducting a validation study. That self-report measuring instruments, by virtue of their very nature, contain inherent threats to validity is well documented in the psychometric literature and this particular instrument is no exception. The study has yielded an instrument with adequate psychometric properties which measures theoretically relevant constructs that may be linked to different collective learning orientations at a conceptual level. From a psychometric point of view, it therefore appears to present a feasible option for inquiring into behaviour relevant to collective learning. What is at issue, however, is whether such an instrument will provide valid and useful information about collective learning behaviour at the level of theory-in-use. Further research with the instrument, and in particular, validation studies, are required to empirically test whether this is possible.

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