Efforts to examine the role that dispositions play in cognitive activity are likely to be repaid in understanding further how individuals think, act and develop. This paper discusses theorising and empirical work which proposes that the dispositions underpinning cognitive activity need to become more central to deliberations about how individuals think about and engage in skilful vocational practice. Such activity has consequences for how and what is learnt, as well as individuals' ongoing development. Central to the analysis provided in the paper is a consideration of Nunnaly's (1976) classification of dispositions as interest, attitude and values. Having reviewed ideas about the dispositional underpinnings of skilful knowledge, the paper reports a study examining how individuals construct knowledge associated with their vocational practice. This study provides tentative findings about the source of dispositions and their role in vocational activity. From these findings, it is claimed that dispositions are socially sourced through individuals' histories and their participation in communities of practice. It is proposed that these sources influence thinking and acting and, hence, cognitive development. Hence, the dispositions which influence how individuals think and act are sourced socially. The paper concludes by advancing some implications for instruction.

Introduction

A recent study was conducted which investigated the outcomes of coal workers' participation in training programs (Billett 1995). In this study, it was widely reported by supervisors, management, union delegates and employees themselves that participation in these training programs had resulted in the development of superficial outcomes. It was claimed that the workers' interest in participation in these programs was motivated, in the main, by a desire to secure higher remuneration rather than acquire additional knowledge. Consequently, the anticipated development of workers' skills was not realised. Although measures can be deployed to improve the rigour of the training and assessment at the minesites, more fundamental questions associated with learning and instruction emerge from this case. What is the role of dispositions (e.g. interest, attitude and values) in individuals' thinking and acting? How can the dispositions required for skilful work be developed? From where are these attributes sourced?
That is, there is a need to consider how, and in what ways, individuals' thinking, acting and learning are influenced by dispositional factors, because to date they have not been effectively integrated into frameworks and categories of knowledge. The paper proposes that dispositions underpin individuals' cognitive attributes in goal-directed activity and, as a consequence, influence cognitive development. Moreover, dispositions are held to be sourced in individuals' ontogenies or life histories (Rogoff 1990) through ongoing engagement in different and overlapping social practice. Therefore, deliberations about learning and instruction need to account for dispositions and their development. To discuss this proposition, the contributions of dispositions to thinking and acting are examined first. This analysis is assisted by Nunnaly's (1976) categories of interest, attitude and values. Next, findings from an investigation into how some individuals construct vocational knowledge are provided. These illustrate the pervasiveness of dispositions in goal-directed activity and, hence, cognitive development as well as the social sourcing of these attributes. In the concluding discussion about instruction, it is advanced that the development of dispositions which underpin skilful work occurs over time. In addition, this development is likely to require guidance from experts and others while engaging in the vocational activities from which dispositions can be accessed.

**Nature and contribution of dispositions**

An account of cognitive structures which are represented in memory and comprise networks of propositional knowledge and orders of procedural knowledge is provided by cognitive theory (Anderson 1982; Scandura 1982; Stevenson 1991). The way individuals conceptualise knowledge and deploy procedures to secure goals is central to this account of thinking and acting. This account owes much to Ryle's (1949) classification of knowledge ‘how’ (procedures) and knowledge ‘that’ (propositions). However, in using these classifications, dispositions, which determine the deployment of these representations and their schematic linkages and organisation, have been set aside. This becomes apparent when some behaviour cannot be adequately explained by either of these categories of knowledge (Martin 1970; Perkins, Jay & Tishman 1993a, 1993b; Prawat 1989). For instance, how can: being considerate of other workers; being appropriately responsive to
customers in retail or restaurant settings; the appropriateness of the level of checking and the self-monitoring required of a motor mechanic; or the safety orientation of long-distance truck drivers be categorised under this classification of knowledge types. It is held that the attributes which best explain these behaviours are dispositions which comprise attitude, affect, interest, values, and identities (Nunnaly 1976; Prawat 1989) and are viewed as individuals’ tendencies to put their capabilities into action (Perkins et al. 1993a, b). Therefore, the potency of dispositions can be appreciated through acknowledging the difference between what individuals may be capable of doing and what tasks they actually undertake. For example, some individuals hold implicit beliefs about knowledge, considering ‘levels of intelligence’ to be fixed, while others consider their levels can be developed further (Dweck & Leggett 1988). Such beliefs influence approaches to, and attitudes about, activities associated with learning (Piaget 1981). Those who believe further development is possible actively engage in demanding tasks, while those who believe ‘intelligence’ is fixed see such tasks as occasions that will expose further their weakness. Posner (1982) also acknowledges the role of dispositions in learning. He states that ‘the beliefs, knowledge and abilities that students bring with them into the learning setting are a product of accommodations to their environments and form frames of reference which students use to assimilate new experiences’ (Posner 1982, p.345). Given the active role for learners in the construction of knowledge, the degree to which individuals engage in, or withdraw from, a particular task will influence what is constructed. For example, individuals are unlikely to engage enthusiastically in acquiring knowledge that they do not value.

However, despite the importance of its role, this form of knowledge is inadequately addressed within the cognitive literature, with its focus on propositional and procedural representations of knowledge. This is not to suggest that cognitive theorists are unaware of the importance of affect and dispositions (e.g. Piaget 1981; Posner 1982) or that there has not been a substantial amount of research on the relationship between motivation and cognition (e.g. Hoffman 1986; Piaget 1981). However, it is only recently that attempts have been made to integrate dispositions directly in frameworks and categories of knowledge (e.g. Perkins et al. 1993a, 1993b; Tobias 1994).
Strategic procedural knowledge (Evans 1991a, 1991b; Gott 1989)—knowing how and when to apply knowledge—has previously been advanced as addressing value and affect. However, this form of knowledge cannot account for whether individuals put their capabilities into action. It is concerned with the efficacy of securing goals, rather than whether the learner thinks they are worth securing (Dweck & Elliot 1983; Goodnow 1990; Tobias 1994) or whether individuals possess the personal confidence or motivation to proceed with the task (Belenky et al. 1986). Dispositions also determine whether individuals value a particular outcome enough to be willing to participate in the effortful activity required to secure the requisite knowledge. For example, Dweck and Elliot (1983) report that school students, with a performance orientation, may determine if participation in a school room activity will result in their ‘looking smart’, which is quite a different goal from determining what they will learn from an activity. Consequently, determinations about engagement in activity may not be adequately addressed by the view of strategic knowledge which focusses on efficacy (what needs to be done, how and when), to the exclusion of dispositional factors (is it worthwhile doing and, if so, how well). However, these views indicate that strategic knowledge has dispositional underpinnings.

Part of the difficulty associated with the inclusion of dispositions in frameworks and classifications of knowledge is the uncertainty about the relationship between these attributes and other cognitive structures (procedures and concepts). Some authors have claimed that the forms of knowledge referred to above are distinct, with the acquisition of one not being dependent on the others (Alexander, Schallert & Hare 1991). Conversely, Rohrkemper (1989) claims the separation of dispositions from other forms of knowledge is a problem as does Vygotsky (1987), who saw this separation as being a key weakness in psychological theory. Piaget (1981) suggests the relationship is one of affect energising cognitive structures, thereby influencing, but being conceptually distinct from, them. Yet, like others, Grusec and Goodnow (1994) also hold that affect and cognition need to be seen as influencing each other in ways that are not likely to be unidirectional or simple.

Certainly it seems that without dispositions, it would be difficult to view procedures or concepts as anything other than inert knowledge. The way
propositions are constructed, for instance, and used as goals for thinking and acting is value laden, as are the construction and deployment of procedures. Just as procedures become compiled, concepts are also chunked permitting their use in ways that might be described as unconscious. Therefore, it is argued that both the conscious and unconscious deployment of concepts and procedures have dispositional underpinnings. Significantly, the degree to which individuals engage in effortful activity is based on their attitudes and values and ‘goals for life’ (Nunnaly 1976). Torney-Purta (1992) integrates dispositions within schematic structures, and Hoffman (1986) argues convincingly that dispositional attributes have a direct influence on cognitive structures and activities, holding that they are embedded in and underpin both knowledge ‘that’ and knowledge ‘how’. He proposes that individuals’ dispositional knowledge initiates, terminates, accelerates or disrupts information processing and determines: ‘which section of the environment is processed and which processing modes operate; it may organise recall and influence category accessibility; it may provide input to the formulation of emotionally-charged schemata and categories; and it may influence decision-making’ (Hoffman 1986, p.246). These latter views consistently support dispositions as being inherent in cognitive activity such as schemata acquisition and its deployment and, as such, underpin both procedural and proposition forms of knowledge. It is important to include here that individuals’ deployment of concepts and procedures in problem solving is associated with reinforcing existing and learning new knowledge (Anderson 1993; Shuell 1990). Thereby, this dispositionally-underpinned activity is associated with cognitive development.

Consequently, frameworks and classifications of knowledge, such as those about cognitive structures, may require modification to acknowledge their dispositional underpinning (Perkins et al. 1993a, 1993b) and the value-laden nature of thinking and acting. Therefore, rather than conceptualising dispositions as a third form of cognitive structures, it is proposed that they be viewed as inherent elements within these structures, which include how they are represented and organised. On this basis, in order to understand more adequately how individuals engage in activities, it is necessary to accommodate dispositional factors in deliberations about knowledge. Moreover, it is
necessary to determine from where these attributes are sourced so that their development can be considered.

Sources of dispositions

Much of the research discussed above (e.g. Belenky et al. 1986; Dweck & Elliot 1983; Grusec & Goodnow 1994) suggests social sources for dispositions, with experiences during individuals’ life histories providing access to these attributes, as they engage in different and overlapping communities of practice. Communities of practice (Lave & Wenger 1991) include the home, workplaces, social groupings and schools. Individuals’ previous performance of particular activities in these communities is likely to influence how they approach and engage in cognitively demanding tasks (Dweck & Elliot 1983). Moreover, the acquisition of knowledge is unlikely to be supported by a culture that does not value that particular knowledge (Lave 1990). Hence, values associated with a particular task may determine whether an effortful or superficial response is forthcoming (Goodnow 1990). Thus, dispositions appear to have dimensions that pertain to: (i) the personal history of individuals or ontogeny (Rogoff 1990); and (ii) particular social practice in which individuals engage in goal-directed activities. The moment-by-moment problem solving (microgenetic development) (Rogoff 1990) utilises individuals' existing knowledge structures in responding to the problem situation within a community of practice. It is proposed that this is the mechanism which constructs the dispositions which underpin cognitive structures and activities. Therefore, the intersection between these two socially-derived sources of knowledge may provide the basis for understanding further the construction of dispositions.

Nunnaly (1976) suggests a framework of interest, attitude and values upon which these attributes can be considered. This framework proposes that: interest refers to preference for a particular activity; attitude characterises feelings about things, usually either positive or negative; and values indicate preferences for 'life goals' or 'ways of life'. This framework is useful because it goes beyond a consideration of specific cognitive activity to include the contributions of broader goals associated with personal history (life goals). Table 1 depicts how the
sources discussed above are likely to be linked to Nunnaly’s framework of dispositions.

Table 1: Nunnaly’s (1976) categories of dispositions and their proposed sources

<table>
<thead>
<tr>
<th>Nunnaly’s categories</th>
<th>Proposed sources of dispositions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest—preference for a particular activity</td>
<td>Likely to be sourced in personal histories (Posner 1982; Tobias 1993, 1994)</td>
</tr>
<tr>
<td>Attitude—feeling about things—positive or negative</td>
<td>Likely to be a product of personal history (Belenky et al. 1986)</td>
</tr>
</tbody>
</table>
| Values—i) life goals —ii) way of life | i) Shaped by personal history (Dweck & Elliott 1983; Dweck & Leggett 1988)  
   ii) Shaped by particular social environment (Goodnow 1990; Grusec & Goodnow 1994; Lave 1990) |

In order to appraise the propositions advanced above, it is necessary to examine the influence that dispositions have on thinking and acting, and, hence, learning. Also, it is necessary to identify the sources of these dispositions. In the next two sections, findings of a two-part investigation of the personal histories of nine hairdressers and their engagement in problem-solving activities is reported. Firstly, in Study 1, the interest, preferences and personal histories of the subjects were determined, along with the circumstances of the particular community of practice in which they worked. In the following section, findings from the hairdressers’ responses to problem-solving activities (Study 2) are reported. These examine the contributions of dispositions to problem-solving activities and hence how subjects source and construct knowledge.

Method

The data reported here are from an investigation which analysed the same vocational practice (hairdressing) in three different settings. Hairdressing was selected as a vocational activity which could be investigated in different settings. These settings were secured in three different locations in Queensland, Australia. These settings were: (i) in a provincial centre; (ii) an outer city suburb; and (iii) an inner city suburb.
The selection was undertaken to provide access to both experienced hairdressers and apprentices in the latter stages of their indenture. Nine subjects participated in this investigation, of whom three were final year apprentices with the remaining six being experienced hairdressers. The investigation comprised two studies.

Study 1

Study 1 elicited data on the circumstances of the hairdressing practice, including the subjects' personal histories. The first goal for the investigation was to understand the practice of the settings where the vocational practice occurred, an objective which demands systematic analysis (Salomon 1991). Hence, an ethnographic approach was adopted to analyse societal conditions, institutional settings and activity structures (Martin & Scribner 1991), because in a given setting, significant experiences will tend to co-occur in a patterned way (Scribner 1984). The data were secured through rounds of interviews and extensive periods of observation at each of the three salons. These activities elicited: (i) a description of the practice by observing the typical activities of experts and novices during busy days (Lave & Wenger 1991); determining the boundaries of the practice, by identifying the nature of social relationships within the community of practice (Goodnow 1990; Lave & Wenger 1991; Luria 1976) (e.g. asking questions on: Which are the activities done only by the expert? Which are the activities done only by the novice?); eliciting perceptions of work practice by asking questions about subjects' perceptions and how they think about and undertake their work, their likes, dislikes and preferences (Goodnow & Warton 1986; Lave & Wenger 1991; Tobias 1994); and asking questions about subjects' categorisations of clients, and how they undertake common daily tasks. In the findings reported below, the subjects are distinguished by a letter and a number (e.g. C8) which refers to the salon the subject is from (e.g. salon A, C or F) and a unique number from 1 to 9.

Study 2

Obtaining accounts of the structuring of individuals' representations of conceptual and procedural knowledge in memory is a complex activity,
given that some form of transformation is likely to occur in any elicited account of these structures. Study 2 aimed to examine individuals’ structuring of knowledge using analyses of protocols from the subjects’ responses to a set of five ill-defined problems. These types of problems are more complex than well-defined problems, as in the former, the start and goal states are unclear, as are the operations required to secure the goal state. Thus, an effect of using ill-defined problems is the need to elaborate more information about state (Voss et al. 1986). These types of problems are viewed as being particularly appropriate for an understanding about vocational knowledge. This is because problems in vocational activities are often ill-structured, with the solver having to construct the goals and the start state (Gott 1989). Knowing which representations are selected from an array of all possible representations provides a great deal of knowledge about the psychology of solver (Newell & Simon 1972).

Accordingly, a set of five ill-defined problems was constructed and administered to all subjects in the second study. The problems were developed from observations in salons in study 1 and from the problem-solving literature. These problems were presented to the subjects as a set of photographs of the would-be client. The subjects were handed a piece of card, with four or five attached photographs of each would-be client and were given a specific problem situation relating to the photographs. The photographs comprised a full frontal picture of the client, and close-up photographs of a front-view, side-view and back-view of the would-be client’s head and face. When the would-be client had long hair, there was an additional photograph with the hair lifted to make sure the neckline was visible. The subjects’ responses to these problems were recorded on an audio-cassette and processed into protocols, which were then analysed and interpreted. The data presented below pertained to two of the ill-defined problems, the data from which best addresses the analysis referred to in this paper. These problems were presented as follows.

**Problem 1 (PR#1)**

*A customer (show photographs of Belinda) claims that you messed up her hair last time and wants you to fix it up. What are you thinking about?
Sub-questions/prompts:
• What will you do?
• What are your goals?
• How will you try to achieve your goal?
• What are your concerns?

Problem 2 (PR#2)

A new customer (show photographs of Robyn), with a birthmark on the side of her face, wants a haircut that is stylish, but won’t reveal the birthmark. What would you do? Why?

Sub-questions/prompts:
• What would you try to achieve? Why?
• How would you achieve this?
• What would you be thinking about as you are working with this customer?
• Do you have any concerns?

The protocol data permit analyses of how dispositions influence choices of goals and procedures, and also the source of those dispositions. The two studies’ findings are reported separately below.

Findings

Study 1: Delineating dispositions and identifying their sources

The interviews in study 1 furnished findings which illustrate commonality and diversity in the subjects’ personal histories, ‘way of life’ or ‘life goals’ (values) and preference. All the subjects with responsibility for apprentices had been apprentices themselves and, with one exception, had experience in other salons or places. These
experiences appeared to have shaped the choice of the current work circumstances or 'life goals' of four of the hairdressers, who had actively sought out their current employment circumstances. Two subjects were, in addition, realising life goals through ownership of a hairdressing salon, in the first instance, and seeking to be respected and admired, in the second. Two female subjects who had young children reported being restricted by their part-time work and domestic commitments. This is indicative of how overlapping engagement in different social practice (work and family) can impinge on one another. However, the values influencing choices were indicative of life goals. These data indicate the role that individuals' socially-determined personal histories (Greeno 1989; Prawat 1989) or ontogenetic development (Rogoff 1990) played in influencing the subjects' practice. Their aspirations, interests and reasons (life goals) for participating in hairdressing appear to have been guided by personal histories. This was also evident in subjects' approach to vocational practice, how they sought to secure goals, and how they categorised clients and planned their work, all of which are important in a goal-directed activity such as hairdressing.

Preference

Subjects' preference was indicative of how dispositional factors had influenced approaches to hairdressing, as table 2 indicates. Using Nunnally's (1976) categorisation of attitudes as being either negative or positive, the subjects' preferences are depicted. For example, while subjects' preferences for hairdressing had similarities across settings, dislikes were more diverse. Four subjects reported concerns emphasising how other responsibilities impinged on their work (i.e. parental role; concerns about owning and managing a business). At one salon, preference for particular techniques was reported, and each salon had a pattern of treatments which reflected its activities. In addition, the three apprentices expressed concerns about interaction with certain types of clients (older, confident, mature women).

Preference for (or against) indicated dispositions associated with clients, particular techniques, business and personal demands. In referring to both 'client satisfaction' and 'work with clients', the data suggest that both goals for hair cutting and procedures used to secure those goals were influenced by preference. Concerns reported across the salons were
quite diverse, being linked to factors characteristic of the salon (at Salon A—some difficult clients) or key values (at Salon F—the hairdressing vocation) and to quite diverse concerns at Salon C (related to running a business; unhappy customers; and tints). These preferences related to both concepts and procedures. These data indicate that both individual and situational factors influence preference for aspects of vocational practice.

Table 2: Subject attitudes towards their work (Nunnaly 1976)

<table>
<thead>
<tr>
<th>Sub</th>
<th>Preference for (likes)</th>
<th>Preference against (dislikes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>satisfying client—chemical and colour</td>
<td>awkward clients and streaking</td>
</tr>
<tr>
<td>A2</td>
<td>working with (some) people—cutting colour</td>
<td>way some clients treat her</td>
</tr>
<tr>
<td>F3</td>
<td>client contact, conversation and cutting</td>
<td>colouring—up-fashion cuts and weddings</td>
</tr>
<tr>
<td>F4</td>
<td>social aspects of work (clients and co-workers)</td>
<td>overlap of responsibilities between family and work</td>
</tr>
<tr>
<td>F5</td>
<td>interaction with clients—cutting</td>
<td>perming and chemicals</td>
</tr>
<tr>
<td>F6</td>
<td>satisfying clients—creative work</td>
<td>unhappy clients and those who are rude on the phone</td>
</tr>
<tr>
<td>C7</td>
<td>helping clients—self-esteem</td>
<td>duties of running a business</td>
</tr>
<tr>
<td>C8</td>
<td>satisfying and working with clients</td>
<td>unhappy clients</td>
</tr>
<tr>
<td>C9</td>
<td>different tasks and working with clients</td>
<td>bad days—tints on tints</td>
</tr>
</tbody>
</table>

Categorisation of clients

A values basis for the categorisation of clients was also evident, and this categorisation appeared to influence the formation of goals and selection of procedures used to secure goals. Again, there was some consistency of client categorisation within settings: at Salon A, categorisation was value-based, drawing on personal histories and concerns (attitudes) towards clients; at Salon F, on occupational and interest factors, such as freedom to be creative; at Salon C, on concerns about treatments and the smooth running of the ‘production-line approach’ adopted at this salon (table 3). This categorisation indicates a negotiation between the internal and external press of these settings. Differences between novices’ and seniors’ categorisations of clients were also evident, indicating the
contribution of personal history. For example, apprentices' categorisations (A2, C9, F6), more than those of the seniors, were based on client attitudinal characteristics. Whereas seniors' categorisations were based on attributes such as age groupings or background.

Table 3: Commonality in categorisation across settings

<table>
<thead>
<tr>
<th>Settings</th>
<th>Commonality in categories</th>
<th>Differences in categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salon A</td>
<td>Personal backgrounds and concerns about clients</td>
<td>A1 client lifestyle (values)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2 openness/ personal confidence (attitudes)</td>
</tr>
<tr>
<td>Salon C</td>
<td>Concerns about treatments and smooth running of production line</td>
<td>C7 what they want to spend (values)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C8 clients' mood (attitude)</td>
</tr>
<tr>
<td>Salon F</td>
<td>Occupational and interest factors associated with clients (e.g. freedom to be creative)</td>
<td>F3 occupation and age (values)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F4 personal standing/values (attitudes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F5 age and openness (values)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F6 openness and sort of demands (values)</td>
</tr>
</tbody>
</table>

However, within categorisations that were comparable across settings, there were also differences (table 3). For example, C8, who saw being 'neat and tidy' as an important personal and occupational goal, classified clients by how they looked after and maintained their hair, whereas F4's classification was particularly influenced by her parental circumstances, preferring young mothers as clients. F3 and F5 preferred younger people and students so they (the hairdressers) could engage in interesting conversations and enjoy greater freedom with hair treatments. Categorisation of clients is an important and perhaps formative step in developing goal states for problem solving. Therefore, variations across and within settings are illustrative of how relations among situation, person and activity (Lave 1993) influence approaches to problem solving and, hence, cognition.

Planning

Preference in approaches to workplace planning reflected a similar pattern of a balance between the press of the situation and subjects' ontogenies. For example, three subjects reported difficulties associated
with effective planning, emphasising the need to be flexible to allow for contingencies, such as awkward customers, more extensive treatments and cancelled appointments. The significance of these subjects was their standing in the communities of practice, as the senior hairdresser (principal participant) in each salon. Both F3 and C7, who carried responsibilities other than hairdressing, emphasised an approach which avoided concerning themselves with the whole day’s activities, instead taking work as it came along. Hence, some subjects scanned the whole day’s appointments first thing in the morning and commenced planning. However, other subjects claimed to consider only the immediate clients, thereby reducing effortful activities associated with potentially unnecessary planning.

Preference arising from personal histories also influenced subjects’ approaches to planning. For instance, whereas F5 planned by intuition, F4 needed to plan to balance domestic and work commitments. Expressions of personal preference were clear at Salon F, where all subjects took a different approach to planning: F3—one at a time, keep appointments planned; F4—need to plan for child care; F5—'how does the day feel’; and F6—planning her area of speciality—colours. As a consequence of the different approaches to planning, the goal-directed activity of hairdressing was organised quite differently by subjects at this setting. The situation was tolerated in this salon as each hairdresser worked independently with their own clientele. However, this practice would not be permissible at the other two salons. Hence, the intersection between the influence of the communities of practice and personal histories was evident in the activity of planning for hair cutting, which necessarily involves problem solving. Moreover, this intersection was differentiated by subjects’ standing in the community of practice. Principal participants (owners/managers) were able to exercise greater discretion in addressing their personal preferences than were novices. However, principal participants had to respond to different, and perhaps additional, demands of the community of practice because of their roles (e.g. paying wages, running a business) than did more peripheral participants. Consequently, the press of the same social practice is not argued as being uniform. Rather, it is argued that the level of participation influences the construction of the hairdressers’ problem spaces, involving the deployment of solution strategies (procedures) required to secure planned goals (concepts).
Study 1 summary

When engaging in the vocational practice of hairdressing, it is reported that the preferences of the hairdressers, how they categorised their clients and planned their work, were influenced by interaction among the external and internal press of the community of practice in which they conducted their work and their personal histories (ontogeny) (table 4).

Table 4: Dispositional influence on subjects' approach to hairdressing

<table>
<thead>
<tr>
<th>Variables</th>
<th>Influences on approach to hairdressing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference</td>
<td>Setting and securing goals, including interaction with clients</td>
</tr>
<tr>
<td>Categorisation</td>
<td>Planning and organising goals</td>
</tr>
<tr>
<td>Planning</td>
<td>Approach to work activities</td>
</tr>
</tbody>
</table>

The interview data revealed differences among subjects' approaches to hairdressing activities, such as how they categorised and worked with clients. It is possible to identify particular sources of preference within subjects' ontogenetic development. For example, F5's lack of training with chemical treatments, or restrictions placed on apprentices at C to learn what the owner-manager believed important. The knowledge used in planning was associated with dispositions and particular social practice. The sourcing found in this study strengthens claims of Perkins et al. (1993b) about the role of dispositional attributes in thinking, and Tobias' (1994) view that dispositions such as interest underpin cognitive activity. Equally, evidence is provided that dispositional factors play a role in how individuals approach the problem-solving activities.

It was deduced from the data that the underpinning dispositional attributes of cognition can be represented as responses to experiences engaged in over time. This occurs through participation in different and overlapping communities of practice as part of ontogenetic development. Then, moment-by-moment problem solving (microgenetic development) (Rogoff 1990), which is the product of interaction between communities and individuals' ontogenetic development, would be influenced by these dispositions.
From analyses of the subjects' preferences, it is proposed that the sources of these dispositions can be clustered as the: (i) internal and (ii) external press of social practice (Pace & Stern 1958) and (iii) press of personal histories (figure 1). Together, the data suggest, the internal and external press represent situational factors associated with a community of practice (Lave & Wenger 1991)—the hairdressing salon where the hairdressers engage in their vocational practice. This has its own set of norms and values comprising the salon's culture of practice (Brown, Collins & Duguid 1989).

![Figure 1: Sources of dispositions (values, attitudes, interest)](image)

The external environment, in the form of clients' demands and preferences, influences the approach to hairdressing problem solving, such as willingness to take risks and interaction with clients. Clientele characteristics provide experiences (preference for certain treatments) which are also likely to influence the hairdressers' activities. The internal press is to privilege certain approaches to hairdressing and, possibly, sanction for activities that are outside the cultural norms. For the peripheral participant (e.g. apprentice), the opportunities to operate outside the norms of the setting are likely to be restricted. In addition to the internal and external press, the subjects' personal histories provide
another source of dispositions. These histories have furnished opportunities for the development of individual sets of values and preferences through participation in unique combinations of overlapping communities of practice. It is argued that these three sources provide for the community and ontogenetic influences on the construction of dispositions, which underpin both concepts and procedures.

The importance of these socially-determined dispositions is that they appear to underpin activities associated with the representation and deployment of knowledge and, hence, cognitive development. As dispositions were different among the subjects, their activities were likely to be influenced by that difference. The balance among the internal and external press of social practice and personal history is different across settings. Thus, there are likely to be consequences for representations of knowledge and problem solving, as these dispositions underpin thinking and acting (Perkins et al. 1993a, 1993b; Tobias 1994). These findings tentatively suggest that the current conceptualisation of problem solving needs extension to account for idiosyncratic cognitive structures and those dispositional attributes which are the product of individuals' ontogenetic development.

This proposition, and those advanced in the earlier discussion and supported by the subjects in Study 1, are appraised further in the second study. Study 2 used subjects' protocols from a series of identical hairdressing problem-solving activities.

Study 2: Influence of dispositions on deployment of cognitive structures

Findings from the protocol analyses undertaken in study 2 provide an account of how the subjects' thinking and acting were underpinned by socially-determined dispositions. Concepts and procedures were identified and analysed on the basis of their being: (i) common; or (ii) common to a particular setting; or (iii) unique, or almost unique, to subjects. The data were verified by the subjects in follow-up interviews. These interviews linked unique concepts and procedures as being
associated with the subjects’ personal histories and also those associated with the community of practice.

**Concepts which are unique to subjects**

Data from the two ill-defined problems have been used in this analysis. Data referring to concepts associated with formulating goals for a hairdressing activity involving changes to a client’s hairstyle (problem 2) and goals associated with handling a client’s complaint (problem 1) are provided. The first example furnishes data on how the conceptualisation of goals resulted in the selection of specific procedures, whereas the second refers to a problem which emphasises the dispositional basis for conceptualising problems.

The first of the problem tasks (problem 2) presented subjects with a dual problem: firstly, the client wanted a change of hair style; and, secondly, the client had a birthmark on the side of her face, about which she was self-conscious. The findings consist in views about how subjects’ dispositions influenced both the formation of goals (concepts) and the procedures selected for the would-be clients. There was a common acknowledgment of the amount of the client’s hair, the client’s face shape/size and the need to consider her birthmark. However, different formulations of goals and preferred solutions were provided by the subjects. For example, C7 regarded the birthmark as a problem of self-concept and proceeded to offer a severe cut which would draw attention to the side of the face (the area of the client’s concern). Other conceptualisations emphasised the shape or size of the face (A1) or the shape of the neck (F4) as something they might incorporate in their goal for the cut.

The commonly proposed procedures were to achieve goals of softening the appearance around the face and leaving the birthmark covered, albeit in different ways (see table 5). On the other hand, C7’s response is indicative of his beliefs about self-concept, which shaped the formulation of his goal for the haircut. Thus, the subjects’ preferred goals and selected procedures appeared to provide a basis for the solution to the problem. It appears that the culture of practice provided the norms for the sorts of solutions that were permissible in the salon, and the subjects selected their preferred solutions from within the array of
possible solutions. That is, the problem space appears to have parameters defined by the culture of practice, leaving the individual to offer solutions from within those parameters that they preferred.

**Table 5: Formulating goals and selected procedures (problem 2)**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Conceptualising goals</th>
<th>Selecting procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Nice face—weight of hair</td>
<td>Straighten it with chemicals, then cut it</td>
</tr>
<tr>
<td>A2</td>
<td>Curly hair—difficult to visualise</td>
<td>Short bob—shaped cut</td>
</tr>
<tr>
<td>F3</td>
<td>Small face—lots of hair</td>
<td>Give her a modern look</td>
</tr>
<tr>
<td>F4</td>
<td>Beautiful neck—lots of hair—looks like a carpet</td>
<td>Soften fringe and layer it</td>
</tr>
<tr>
<td>F5</td>
<td>Stylish means shorter</td>
<td>Give her a piecey hair cut—long bits coming in front of ear</td>
</tr>
<tr>
<td>F6</td>
<td>Curl—length</td>
<td>Cut long hair into style—reduce length by stages</td>
</tr>
<tr>
<td>C7</td>
<td>Self-image—she should learn to ignore birthmark</td>
<td>An asymmetrical cut, short</td>
</tr>
<tr>
<td>C8</td>
<td>She's all hair—small face for all that hair</td>
<td>Take up length and layer it around her face</td>
</tr>
<tr>
<td>C9</td>
<td>Change it—hold it up</td>
<td>Shorter bob—reduce bulk</td>
</tr>
</tbody>
</table>

In the second problem, dispositional factors were evident in responses (table 6) to a client's complaint about the hairdresser having 'messed up her hair'. For example, F3, who disliked conflict, proposed that the client may be in the wrong salon, while F4 claimed it was the client's problem, proposing that something was wrong in her life. F5's desire to re-establish relationships with clients resulted in his suggesting lots of attention and pampering. The apprentice's (F6) concerns included her standing in the community of practice—the fact that she was an apprentice. To take another example, at C, the owner's interest was in resolving the problem quickly to minimise damage to the salon's reputation in the client community. C8's response was associated with self-doubt and concerns about her reputation in the town in which she lived and worked. Whereas the apprentice, C9, viewed the problem as an opportunity to learn. So, while all subjects would seek to secure the client's satisfaction, by fixing up the problem, their goal-determining dispositions towards the same problem were quite different.
Table 6: Attitudinal responses to client complaint (problem 1)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>‘Where have I gone wrong?’</td>
</tr>
<tr>
<td>A2</td>
<td>‘What has she (client) done wrong?’</td>
</tr>
<tr>
<td>F3</td>
<td>‘Always take it personally’</td>
</tr>
<tr>
<td>F4</td>
<td>‘Something wrong in their (clients) lives’ ‘something more than haircut’</td>
</tr>
<tr>
<td>F5</td>
<td>‘Control ego—get control of yourself’</td>
</tr>
<tr>
<td>F6</td>
<td>‘What did I do wrong?’</td>
</tr>
<tr>
<td>C7</td>
<td>‘Must sort out the problem’</td>
</tr>
<tr>
<td>C8</td>
<td>‘Sick feeling’—‘don’t know everything’</td>
</tr>
<tr>
<td>C9</td>
<td>‘Everybody’s been through it—opportunity to learn’</td>
</tr>
</tbody>
</table>

Within the responses to this problem, attitudes (Nunnaly 1976) and personal doubts differed across subjects and influenced how subjects approached problem-solving tasks (e.g. Belenky et al. 1986; Dweck & Elliot 1983; Dweck & Leggett 1988). For example, during interviews, and in the validation process, some subjects reported concerns associated with their personal confidence (attitude) in securing goals, which influenced the goal they selected. This confidence determined how far one would go with a particular client or, as F3 reports, ‘the degree that you are willing to take risks’. For example, some younger hairdressers reported how uncertainty in their relationship with some mature or dominant clients influenced the selection of hairdressing goals and procedures. This uncertainty influenced the degree of risk taking in suggesting a solution. In this way, the search or problem space was likely to be shaped by a restricted (less risky) set of options.

It was reported by some subjects that challenges to competence influenced their approach to clients and degree of risk taking that even some senior hairdressers engaged in when formulating goals. However, from the protocol analyses, it was evident that sources of these attitudes were different. C7’s concern was about losing the local client community’s confidence, while C8’s was about her personal standing in the community in which she lived. F3 reported this concern as being a challenge to his competence, as did F5. F6 viewed concerns as a product
of being an apprentice—a peripheral participant in the community of practice. Equally, A1, although a supervisor, had concerns about her security of employment and the frequency of complaints which she had to manage. Thus, there was evidence that standing in the practice influenced the dispositional basis for problem solving, as did different external press upon that practice. For instance, in the problem-solving activities it is possible to identify both personal history (life goals and way of life) of individuals and also those attributes shaped by the community of practice.

Sources and influences of dispositions: A summary

It is inferred from the data analysed above, using Nunnaly’s (1976) categories, that the dispositional underpinnings of the representations of conceptual and procedural knowledge influenced the subjects’ thinking and acting (problem solving). Values appeared to determine the sort of activities that the hairdressers engaged in and how they engaged in these tasks. Both personal histories and the internal and external press of the circumstances in which individuals engage in socially-determined activity were identifiable in the data. This supports the tentative claims that dispositions have social sources. Differences in individuals’ dispositions appeared to be the product of their construction of knowledge, which was socially derived from experiences during their ontogenetic development. During this development, individuals engage in ongoing and overlapping forms of social practice. The data provided evidence of the contributions from but one social source (community of practice) that these individuals engaged in: their particular vocational practice.

In almost every circumstance, the subjects, during the validation phase, were able to account for their approach as being the product of specific experiences. They were able to refer to treatments they had learnt in other countries (A1, C7), personal experiences (F3, F6 and C8), or those of acquaintances (A2). Subjects were also able to account for their choices in more precise terms. These included their experiences (where they had been apprenticed, worked, gone to college, etc.); sources of expectations from their values and life goals (trendy salons, other salons, friends, etc.); and images (magazines, streets, styles, etc.). In sum, it was possible to
identify the way individuals' ontogenies shaped representations of knowledge and problem-solving activities and had done so in different ways.

Analyses of the data tentatively demonstrates that, in these salons, dispositions, beyond capabilities, influenced how individuals thought and acted. The findings illustrate the value-driven nature of thinking and acting for this sample. For these reasons, it is argued that frameworks and categories of knowledge, such as those referring to cognitive structures and their development, remain incomplete without a consideration of underpinning dispositional factors such as attitude, values and preference.

Conclusions: Some considerations for instruction

This study has implications for instructional practice. For instance, what can be done to assist the development of dispositions required for skilful work? For example, how is it possible to enhance the coal workers' desire to engage in the effortful activity of learning required to secure vocational knowledge?

It is necessary to suggest, in the first instance, that the development of dispositions is likely to be characterised as a lengthy and indeterminate process. The tendencies which underpin action are probably more demanding to construct than 'value-free' algorithms or sets of propositions. Take, for instance, values or 'way of life' (Nunnaly 1976). If we take Piaget's view of accommodation and assimilation, values are unlikely to be readily changed in adults, but may be transformed over a period of time if appropriating and validating experiences are forthcoming. Moreover, it is likely to take time, because values coalesce as a product of ontogeny and participation in communities of practice in ways that are person dependent.

The sources of dispositions and the microgenetic contribution made to dispositional knowledge through participating in communities of practice may offer the most likely basis for influencing the dispositional underpinning of concepts and procedures (figure 1). Perkins et al. (1993b) propose a combination of (i) exemplification; (ii) direct
transmission; (iii) involvement in activities; and (iv) interaction to promote the development of dispositional attributes to effective thinking. These approaches are sympathetic to constructivist ideas about joint problem solving between the learner and more expert other (e.g. Vygotsky 1978; Collins, Brown & Newman 1989; Brown & Palinscar 1989), with the expert other making explicit what may be hidden from the learner and providing models for learning (Billett 1996). Close guidance by more expert others is likely to be required to emphasise the purposefulness of participation in activities and seek opportunities for the reinforcement provided by experiencing the viability of knowledge.

However, some experiences will not always be realisable or desirable (e.g. accidents) and the expert other may be required to emphasise the importance of taking the ‘right’ action and reinforcing externally the values and beliefs that underpin that action. Equally, the individual’s standing (emphasis on responsibilities and decision making) is likely to influence the construction of dispositions. It seems unlikely that such values and beliefs will be generated, except through participation and immersion in authentic experiences, as it is through such activities that clear goals and validating experiences can be found. This participation will also provide indirect forms of guidance which contribute to microgenetic development, such as observation, indirect modelling and listening. These forms of guidance have been reported by workers as being highly valued in the acquisition of vocational knowledge (Billett 1993, 1994), although there is the danger that inappropriate dispositions might also be encountered and developed.

So, in sum, these studies suggest that the dispositions which underpin cognitive activity are the product of ongoing participation in social practice which contributes to individuals’ ontogenetic development. It is argued that the circumstances in which these attributes are most likely to be secured is the community of practice where the knowledge is to be deployed. The activities in which individuals engage need to be authentic in terms of the activities of the community, rather than being undertaken in substitute environments. Moreover, it is argued that direct and indirect guidance by experts and others permits the learner to participate in joint problem solving and gain access to the beliefs and values of culturally-significant knowledge. Through such experiences, the interaction between the individual’s ontogeny and participation in
communities of practice is likely to engender appropriate beliefs and values which manifest themselves as individuals' dispositions.

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