The mindful control over learning: the relationship between dispositions towards task engagement and dispositions towards control over task engagement.

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Abstract

Salomon & Globerson's (1987) notion of "mindful" and "mindless" approaches to metacognitive control over learning are related to existing dispositional measures of task engagement. Existing approaches to learning instruments are characterised as distal indicators of how mindfully learners conceptualise, approach, and undertake learning. It is contended that existing instrumentation is less indicative of dispositions towards executive control over metacognitive decisions: that the effectiveness of executive decisions pertaining to both the content of what is to be learned and the procedural prerequisites for dealing with that content may well be

mediated by predispositions towards the executive management of those decisions.
This contention is discussed in relation to the development of a distal measure of
executive strategy control.

Introduction

One of the major attributes of academic learning is that it involves the processing
and understanding of complex and generally highly abstract information (Kirby,
1988; 1991; Kirby & Cantwell, 1985). Complex and abstract learning necessarily
involves the learner in a range of strategic decisions. Such decisions implicate the
learner in accommodating competing demands both within and between potential
levels of meaning and understanding. Within the constraints of a limited capacity
processing system, how these competing content and strategic demands are resolved
is the subject of the present paper. It is contended that, in the first instance,

successful learning is characterised by active and volitional use of metacognitive
knowledge as the basis for the control over processing. Following Salomon and
Globerson (1987), Prawat (1989) and Shuell (1990), it is further contended that the
way in which individuals utilise metacognitive knowledge may be described in
dispositional terms: that individuals, through both experience and instruction,
generate abstractions about the nature of learning and the procedures that underlie
learning, and that these abstractions may form the basis of predispositions
mediating the way future learning is undertaken.

Such predispositions have formed the basis for the development of a number of
distal measures of individual differences in approaches to learning and general
cognition, including general perceptions of the inherent attractiveness of cognitive
activity (Cacioppo & Petty, 1982), perceptions of the nature and goals of learning

environments (Ames & Archer, 1988), as well as individual differences in perceptions of what the goals of learning entail and how these may be operationalised (Biggs, 1987a; Entwistle & Ramsden, 1983; Schmeck, Ribich & Ramanaiah, 1977; Schmeck, Geisler-Brenstein & Cercy, 1991). Underlying each of these distal measures is a conception of metacognitive activity addressing differences in the nature of task engagement, of differences in how and why individuals engage in cognitive activity.

Recent research into the nature of metacognitive activity, however, has suggested that metacognitive processes may involve more than reflections about one's extant state of content and strategic knowledge, that metacognitions also involvereflections on and judgements about the metacognitive decisions themselves. In other words, a number of researchers have placed equal emphasis on the activation and use of an executive control mechanism as a superordinate dimension to metacognitive decision-making (Evans, 1991; Derry & Murphy, 1986; Stevenson, 1986; Lawson, 1984; 1991). This distinction between metacognitive knowledge (as the sum of one's cognitions about extant content and strategic knowledge) and executive control (as the sum of one's cognitions about the efficacy and utility of that metacognitive knowledge) provides the theoretical basis for the central focus of this paper: that the principle of dispositional differences between individuals in the nature of task engagement may be further extended to identify dispositional differences in the way individuals approach the problem of executive control over strategic decisions.

Dimensions of Executive Strategy Control

The notion of an executive control mechanism within the broad area of metacognition is now quite accepted by researchers (Lawson, 1984; 1991; Corno, 1986; Derry & Murphy, 1986). That complex learning requires control over not only the content of what is to be learned (Voss, 1987; Prawat, 1989; Alexander, 1992), but also over the procedural prerequisites for accessing and dealing with that information (Prawat, 1989; Nelson & Narens, 1990; Silver, 1987), has been well established in the literature. In the present paper, a more specific aspect

of
executive control is proposed, one which accounts not only for the need to activate
and regulate procedural knowledge as part and parcel of one's metacognitions, but

which also suggests that consistent individual differences in predispositions towards
the management of strategic decisions may well be described and operationalised.

It is hypothesised that the principle of executive strategy control involves more than
decisions of which strategy to use when in processing, it involves also questions of a
pre-emptive preparedness to acknowledge the need for choice in strategic decisions
(Reder, 1988) combined with an in situ preparedness to acknowledge the need for
controlled regulation and orchestration of such executive decisions (Schoenfeld,
1987). A priori then, the principle of executive strategy control involves notions
beyond the possession of narrower or broader strategy repertoires: it also involves
more fundamental perceptions of what the learning process itself entails, and to
what degree the individual is willing to actively and reflectively engage in learning
activities (Evans, 1991; Borkowski, Carr, Rellinger & Pressley, 1990; McCombs,
1988). Salomon and Globerson (1987) allude to the integration of intention and
strategic deployment in their conception of "mindful" as opposed to "mindless"
engagement in learning. Mindfulness refers to the effortful, but consciously self-
regulating control over processing; mindlessness to the less effortful, automatic
application of externally cued processes or of habitually applied overlearned
processes. In both instances, the same strategic repertoire may be called upon: the
distinction lies in the degree of mindfulness associated with their use.

The mindfulness construct further implicates a dispositional element in accounting
for individual differences in preparedness to actively plan and monitor strategic

decisions (Prawat, 1989; Salomon & Globerson, 1987; Cacioppo & Petty, 1982).Prawat (1989), for example, suggests that dispositions and strategic mastery are closely linked: that "it is when an act is mastered at the strategic level that more abstract or dispositional ways of characterising the act begin to emerge" (p5; also Derry & Murphy, 1986; Shuell, 1990). In Salomon & Globerson's (1987) terms, the reformulation of strategic knowledge through mastery is reflected in the capacity for, and tendency towards, more mindful action. Salomon & Globerson refer to such tendencies or dispositions as "distal sources" of mindfulness, arguing that, while mediated by proximal sources such as task demands, such distal measures provide useful predictors of what may happen (as opposed to experimentally determining what can happen) under normal learning conditions.

In the context of executive strategy control two central predispositions appear to be important in generating more mindful engagement in learning: the preparedness to plan and a preparedness to monitor strategic decisions. The planning component refers to a disposition towards reflective planning of strategic activity, incorporating a need for both structuring and organising task-appropriate content knowledge (de Jong & Ferguson-Hessler, 1991; Veenman & Elshaut, 1991; Ramsden et al, 1989; Ploger, 1988) and strategy knowledge (Swanson et al, 1990; Derry & Kellis, 1986; Paris et al, 1984) and a preparedness to engage in open rather than closed reflection in determining optimal approaches to the task prior to engaging in the task (von Wright, 1992; Meyer & Dunne, 1991; Torrance et al, 1991; Borko & Livingstone, 1989; Schoenfeld, 1987). The monitoring component indicates a preparedness to implement and monitor the utility and efficacy of strategic decisions, both at the general dispositional level (Bordage et al, 1990; Stevens,

1988; Ghatala et al, 1985; Britton et al, 1982), and in terms of a more specific recognition of the need for in situ strategic analysis and change (de Jong & Ferguson-Hessler, 1991; Delclos & Harrington, 1991; Kleitzen, 1991;

Swanson,
1990; Borko & Livingstone, 1989; Cook & Mayer, 1988; Schoenfeld, 1987;
Owings
et al, 1980).

Where planning and monitoring represent two central attributes of
mindfulness in
executive control, Salomon and Globerson's (1987) concept of "mindlessness"
also
implicates a contrasting disposition towards executive strategy control.
Salomon &
Globerson (1987) suggest that mindlessness is not necessarily associated
with a lack
of effort, but that mindless processes may be the result of shallower
interpretations
of problems, leading to the uncritical activation and use of existing
schemata and
scripts. Hence effortful behaviour may result, but it becomes behaviour
characterised by "repeatedly attacking the problem by using the same
inefficient
strategy without much consideration of its situational appropriateness and
without
considering alternative strategies" (p626). In other words, where
mindfulness
implicates flexibility in planning and monitoring strategic decisions,
mindlessness is
associated with an inflexible disposition toward strategic decision making
and
application and a lesser likelihood of reflectively monitoring the efficacy
of strategic
decisions.

In Garner's (1987; 1990) terms, the misapplication of extant strategic
knowledge is
described as "flawed" metacognition: that while cognitive failure may
invoke
metacognitive activity, attempted metacognitive resolution in situations
whereinadequate planning or monitoring occurs may yield either unchanged
strategic
behaviour, or a state of cognitive confusion. According to Garner (1990),
unsuccessful strategic adjustment may result from five sources: (1) from
poor
cognitive monitoring (Bordage et al, 1990; Schoenfeld, 1987; Derry &
Kellis, 1986;
Owings et al, 1980); (2) from primitive or inappropriate strategic routines
(Meyer
& Dunne, 1991; Torrance et al, 1991; Bordage et al, 1990; Ramsden et al,
1989);
(3) from a restricted knowledge base (Bordage et al, 1990; Derry & Kellis,
1986);

(4) from inappropriate attributions or classroom goals (Borkowski et al, 1990; Volet & Renshaw, 1990; Carver & Scheier, 1988); or (5) from minimal transfer of strategic knowledge (Shuell, 1990; Stevens, 1988; Voss, 1987). In a similar vein, Perkins and Simmons (1988) identify three sources of misunderstandings in student learning: in naive or uninformed concepts; in the use of uninformed, but ritually and inflexibly applied knowledge frames; or in the uncritical use of flawed theory.

In both Garner's (1987; 1990) description of flawed metacognition, and Perkins and Simmons' (1988) explanation of student misunderstandings, two crucial "pathologies" (Entwistle & Ramsden, 1983) or negative attributes of executive strategy control are apparent. One the one hand, following Bordage et al's (1990) "deterministic" problem solvers and Salomon and Globerson's (1987) "mindless" task engagement, there is an apparent disposition to not monitor the efficacy of intended or actual cognitive activities, reflected in an inability or unwillingness to perceive incongruities between the task and strategic decisions. This pathology implicates an inflexibility dimension in the executive strategy control construct. On the other hand, evidence also exists to suggest that inefficient metacognitions may

also be apparent where conscious decisions to modify the processing activities are made, but where the attempted metacognitive resolution is unsuccessful (Garner, 1987). Schoenfeld (1987), for example, reported a high state of confusion amongst less efficient mathematical problem-solvers where the solution path followed could not yield a successful outcome. The inability of learners to either effectively plan and monitor goal-appropriate processing strategies or to effectively generate alternative strategic paths in response to processing impasses indicates a second pathology associated with flawed executive strategy control: that of strategic ambivalence.

The discussion of the principles underlying executive strategy control thus suggest four dimensions to the construct: two positive dispositions associated with preparedness to actively plan and to actively monitor strategic behaviours, and two negative dimensions associated with the inflexible application of extant strategy repertoires, and with ambivalent resolution of strategic impasses. The extent to which such dispositional attributes of executive strategy control may be generalised to the level of identifiable predispositional attributes amongst learners is the subject of discussion in the following section.

Formalising a Distal Measure of Executive Strategy Control

The discussion in the previous section indicated that in dealing with complex and abstract learning, successful learners are planful in approaching learning, and are inclined towards monitoring the efficacy of the strategic decisions made prior to andduring task performance. Such planfulness and monitoring necessarily involve consideration of strategic options, involving the construction of some kind of strategy-task congruence. It was further suggested that learners disposed towards more mindful task engagement are those who actively and volitionally undertake such controlled metacognitive activity. Both Salomon and Globerson (1987) and Prawat (1989) suggest that the disposition towards such mindful task engagement may represent more than a state-like condition: that mindfulness may represent a more abstract generalisation about learning that transfers as a general predisposition across tasks and across contexts. If this is the case, then a rationale exists for formalising such predispositions as distal indicators of how learning may be approached and undertaken.

In acknowledging the possibility of formalising a distal measure of mindfulness, it is of importance to note that the concept of mindfulness itself implicates at least two broad dimensions of metacognitive disposition: those pertaining to the nature of

task engagement, and those pertaining to executive control over task engagement.
These two dimensions are consistent with more recent conceptions of the nature of
metacognition, where metacognitive knowledge is separated from executive control
(Lawson, 1984; 1991; Derry & Murphy, 1986). In the first instance, there are a
number of instruments which may be associated with individual differences in
perceptions of the nature of task engagement. In particular, in what may be termed
the "approaches to learning" literature (Schmeck, Ribich & Ramanaiah, 1977;
Schmeck, Geisler-Brenstein & Cercy, 1991; Entwistle & Ramsden, 1983; Biggs,
1987a), reasonably powerful and robust distal indicators of learner conceptions of

the goals of learning and of associated strategic behaviours in learning have been
developed. As a generalisation, these instruments have suggested two orthogonal
approaches: a "deep" approach associated with a commitment to high-order
understandings, and a "surface" approach, characterised by a disassociation with the
higher-order goals of learning, and a commitment to rote reproduction of material
to be learned. While these instruments provide insights into how and why learners
engage in learning, they offer little direct evidence for differences in the way
individuals dispositionally approach the problem of executive control over
metacognitive decisions. It is this latter deficit that provides the theoretical and
empirical basis for the development of an instrument sensitive to the four
hypothesised dimensions of executive strategy control alluded to in the first section
of this paper.

While the existing instruments offer little direct evidential support for the proposed
dimensions of executive strategy control, there exists, nonetheless, strong indirect
support within these instruments for the presence of the dimensions as analogues to
the identified approaches to task engagement (see Table 1). The necessity to
engage in active planning and monitoring is implicit in the "deep" conceptions of
learning reflected in Schmeck's Inventory of Learning Processes (ILP)

(Schmeck et
al, 1977; Schmeck et al, 1991), in Entwistle and Ramsden's (1983)
Approaches to
Studying Inventory (ASI), as well as Biggs' (1987b) Study Process
Questionnaire
(SPQ). All three instruments characterise "deep-type" learning as involving
the
generation of personally meaningful representations of the material to be
learned,
implicating a need to utilise highly structured prior knowledge, and to use
thisknowledge as the basis for monitoring understanding of the new
information. Such
approaches are conventionally associated with more abstract learning
outcomes
(Schmeck & Phillips, 1982; van Rossum & Schenk, 1984; Cantwell & Biggs,
1988),
suggesting as a further disposition, a capacity of learners utilising
"deep-type"
approaches to task engagement to orchestrate and integrate content and
strategies
across a number of levels of meaning (Cantwell & Millard, 1992; Kirby &
Pedwell,
1991).

The characterisation of "surface-type" approaches to task engagement within
these
instruments also implicates dispositions towards executive strategy
control. Surface-
type approaches to learning in each of the instruments are characterised by
restrictive goals, by an unwillingness to elaborate meanings beyond literal
parameters, and thus, by default, with the utilisation of a much more
restrictive
range of strategy options (Cantwell & Millard, 1992). Associated with the
more
closed and restricted conception of learning are qualitatively lower level
outcomes
(Biggs, 1979; van Rossum & Schenk, 1984; Meyer & Dunne, 1991). The inherent
narrowness of this conception of the nature of learning is suggestive of a
similarly
narrow conception of executive control: where decisions pertaining to how
content
is to be addressed are limited, the necessity for adjustment of strategic
decisions is
similarly limited. Thus any dispositions towards executive control are more
likely to
be associated with "mindlessness" in Salomon and Globerson's (1987) terms:
that
the way one habitually deals with content to be learned is perceived as
appropriate
across all tasks and contexts. Hence one's disposition is towards

inflexibility in
strategic decision making. While most evident in the characterisaton of surface

learning, Entwistle & Ramsden's (1983) description of the "deep globetrotter"
reflects a comparable narrowness of content focus, and accordingly of strategic
decision making and control.

The evidence in the approaches to task engagement instruments pertaining to ambivalent executive strategy management is less apparent. Clearly one implication
of highly deterministic or inflexible approaches to learning is the occurrence of
strategy- task incongruence, and given the narrowness of the strategic environment
associated with the inflexibility dimension, it is reasonable to assume that inflexible
learners should experience processing imbroglios as a consequence of the strategy-
task mismatches. Cantwell and Millard (1992), for example, found a consistent
reliance upon external sources to resolve difficulties in learning novel music
amongst high surface learners, suggesting an inability to internally resolve strategic
difficulties. Implicit evidence of strategic confusion and/or loss of control is evident
in the "Disorganised Study Methods", "Globetrotting" and "Improvidence" sub-scales
of Entwistle and Ramsden's LSI as well as (negatively) Schmeck et al's (1977)
"Synthesis-analysis" sub-scale.

Empirical Validation of the Executive Strategy Control Construct

The principle of executive strategy control as a dimension of mindful task engagement implicates four possible attributes of executive control behaviours:
planning and monitoring of strategic behaviours as positive attributes, and
inflexibility and/or ambivalence in strategic behaviours as negative attributes.Cantwell (1990) administered a pilot instrument (the Strategic Flexibility
Questionnaire [SFQ]) based upon these hypothesised dimensions to 281 undergraduate education students. Subsequent factor analysis revealed a three
factor solution in which the planning and monitoring dimensions were included in a

common factor labelled Adaptive Strategy Management, while the two predicted negative attributes of executive control were indicated by the remaining factors labelled Algorithmic Strategy Management and Ambivalent Strategy Management. The reliability coefficients (Cronbach's alpha) for each of the scales were all around the .80 level. These results confirmed the construct validity of the SFQ as a distal indicator of mindful executive control over strategic behaviours. The study also sought to address the issue of concurrent validity of the SFQ construct to distal measures of task engagement. It was argued from a theoretical standpoint that a complementary relationship should exist between measures of executive control and more general measures of the mindful approach to task engagement. The SFQ scales were thus entered into a correlational analysis with students responses to Biggs' (1987b) Study Process Questionnaire (SPQ). As predicted, adaptive strategy management correlated positively with both a deep and achieving approach, while both algorithmic and ambivalent strategy management correlated positively with the use of a surface approach.

Issues relating to the predictive validity of the SFQ were addressed in a series of studies with both Education and Nursing students (Cantwell, 1990; Cantwell & Moore, 1990; 1991). In studies relating predispositions of education and nursing students towards executive strategy control to general academic performance

(Cantwell, 1990; Cantwell & Moore, 1991), students in both areas reporting adaptive strategy management styles achieved significantly higher grades than those reporting lower levels of adaptiveness. Algorithmic management tended to remain neutral in effect for most areas of learning, although evidence for negative effects were evident in the more theoretically oriented subject in education. The strongest predictor of performance in general academic learning for both education and nursing students, however, was the ambivalent strategy mangement scale. In

both
settings, students reporting higher levels of ambivalence performed significantly
more poorly in all subjects than was the case for students reporting lower levels of
ambivalence.

A further study with nursing students (Cantwell & Moore, 1990) investigated the
predictive validity of the SFQ in relation to applied academic learning. 87 final year
nursing students completed a simulated clinical exercise involving the planning,
observing and reasoning about a specific clinical problem. Adaptive management
was unrelated to performance on these tasks. Algorithmic management appeared
only to influence evaluative behaviours, with high algorithmic nurses less likely to
adopt broad criteria for evaluating clinical interviews. The strongest effects were
again evident for subjects reporting higher levels of strategic ambivalence. Nurses
reporting ambivalent strategy management were more limited in their perceptions
of the purposes of a clinical interview, were less able to justify their strategic
planning, and reported fewer dimensions of information in their clinical assessments.

Conclusions

It was the intention of this paper to offer a theoretical rationale for the
development of a distal measure of individual predispositons towards executive
control over strategic decision-making. It was argued, following Salomon and
Globerson's (1987) model of "mindful" approaches to learning, that part of one's
metacognitive control over learning involves not only reflections about extant
knowledge and strategic states, but also reflections about the efficacy and utility of
that knowledge. These latter components of metacognition were referred to in
terms of an executive control mechanism responsible for planning, monitoring and
orchestrating strategic behaviours. It was contended that within the principle of
executive strategy control, two positive attributes (planning and

monitoring) and
two negative attributes (inflexibility and ambivalence) of executive
strategy control
could be identified as dimensions of individual differences amongst
learners, and
that these differences may generalise to the level of predispositions.
Subsequent
empirical studies validated the notion of executive strategy control, in
which the
planning and monitoring generalised into a single adaptive strategy control
dimension, while the inflexibility (algorithmic strategic control) and
ambivalent
dimensions emerged as clear negative attributes. The predictive validity of
the
scales was confirmed in studies of academic learning with both
undergraduate
education and nursing students.

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Table 1: Items included in existing instruments of approach to task engagement implicating dimensions of executive strategy
control

Dimensions of Executive Strategy Control	Sample Items from existing instruments Biggs' (1987) SPQ	Schmeck's (et al 1977; et al 1978; et al 1991) ILP	Entwistle & Ramsden's (1983) LSI	Cacioppo & Petty's (1982) Need for Cognition
Planning	Deep Approach I find most new topics interesting and often spend extra time trying to			

obtain more information about them

Achieving Approach
I make a point of looking at most of
the suggested readings that go with
the lecturesSynthesis-Analysis
I have difficulty planning work
when confronted with a complex
task (negative)

Study Methods
I usually refer to several sources in
order to understand a concept

Elaborative Processing
I am usually able to design
procedures for solving a problemDeep Approach
When I'm tackling a new topic I
often ask myself questions about it
which the new information should
answer

Relating Ideas
I need to read around a subject
pretty widely before I'm ready to
put my ideas down on paper

Use of Evidence
In reporting practical work, I like to
work out several alternative ways
of interpreting the findingsI really enjoy a task that involves
coming up with new solutions to
problems

I tend to set goals that can be
accomplished only by expending
considerable mental effortMonitoringDeep Approach

I try to relate new materials I am
reading it, to what I already know
on that topic

Achieving Approach
After a lecture or lab I re-read my
notes to make sure they are legible
and that I understand themElaborative Processing
New concepts often make me think
of many other similar concepts

After reading a unit of material I sit
and think about it for a while
Relating Ideas
In trying to understand new ideas,
I often try to relate them to real life
situations to which they might
apply

Use of Evidence
I am usually cautious in drawing
conclusions unless they are well
supported by evidence