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MEMORY SELF-EFFICACY IN ITS SOCIAL COGNITIVE CONTEXT

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The greatest mistake in modern psychology is to treat the self-in-its-world as a self separated from its surroundings.

(Reed, 1994, p. 278)

...Accounts of memory gain their meaning through their usage, not within the mind nor within the text, but within social relationships.

(Gergen, 1994, p. 89)

This chapter takes a primarily cognitive construct—memory self-efficacy (MSE)—and returns it to its roots—social cognition (Bandura, 1986). This is a natural and obvious move. MSE has evolved since the mid-1980s (Berry, West, & Powlishta, 1986; Hertzog, Dixon, Schulenberg, & Hultsch, 1987) to its present identity and status in the cognitive aging and adult developmental research literature. If it is to avoid becoming a hypothesis in search of data (Light, 1991) or worse, an epiphenomenon to more robust explanations of cognitive aging (e.g., speed) (Salthouse, 1993), its potential and limits must be scrutinized and subjected to rigorous new research agendas. Arguably, MSE has arrived at its present destination via metamemory (Dixon, Hertzog, & Hultsch, 1986; Hertzog, Dixon, & Hultsch, 1990a; Hertzog et al., 1987; Hultsch, Hertzog, Dixon, & Davidson,

1988), thereby acquiring a more cognitive emphasis than its clinical and social underpinnings suggest. This chapter presents MSE research from my lab that has been conducted from the orienting framework of self-efficacy theory and methodology (Bandura, 1977, 1986, 1997; Bandura, Adams, Hardy, & Howells, 1980; Bandura, Reese, & Adams, 1982). The value of this framework lies in its rich theoretical foundation, its unique measurement approach, and its ties to social cognition. The goal of the chapter is to evaluate the present status of MSE research and to suggest new research directions.

WHAT IS MEMORY SELF-EFFICACY?

Memory self-efficacy (MSE) refers to a dynamic, self-evaluative system of beliefs and judgments regarding one's memory competence and confidence (Berry & West, 1993; Cavanaugh, Feldman, & Hertzog, 1998; Cavanaugh & Green, 1990; Hertzog & Dixon, 1994; West & Berry, 1994). In practice, my colleague Robin West and I have adopted a conceptual and methodological approach to the MSE construct that is derived strictly from Bandura's model and methods. In this approach, MSE is a self-judgment about one's ability to perform a given memory task competently and with confidence. Our operationalization of MSE typically yields a summary competence score (MSE level) and a summary confidence score (MSE strength); both are derived from a memory task hierarchy comprising increasingly difficult levels of a given memory task (e.g., remembering 12 words). These two scores are assumed to reflect an individual's appraisal of the relevant features of the task and situation, the relevant ability and affective characteristics of the self, and other stored and concurrent sources of efficacy information. Note, though, that these components of MSE judgments are not measured (directly) and are only *assumed* to be operative when a self-efficacy judgment is made. Our measures of MSE are composed of concrete task-descriptive items with high face validity. Thus, our conception of MSE is intentionally conservative and constrained and does not represent, per se, generalized beliefs or complaints about memory. Our research on MSE is an effort to systematically test tenets of self-efficacy theory, and we argue that the most rigorous and fruitful initial tests of the theory must be based on a strict definition and operationalization of MSE. Other approaches that take a more liberal, encompassing view of the MSE construct and memory beliefs in general are represented in this volume (see Hertzog, Lineweaver, & McGuire, Chapter 3, this volume; Soederberg Miller & Lachman, Chapter 2, this volume); together, the different approaches will help to establish the construct, discriminant, and predictive validity properties of MSE and memory beliefs.

The model of self-efficacy depicted in Figure 4.1 illustrates the causal sources and effects of MSE judgments. The direction of cause to effect in this model is generally from left to right; however, arrows between some constructs are omitted intentionally to indicate the reciprocal nature of some relationships. For example,

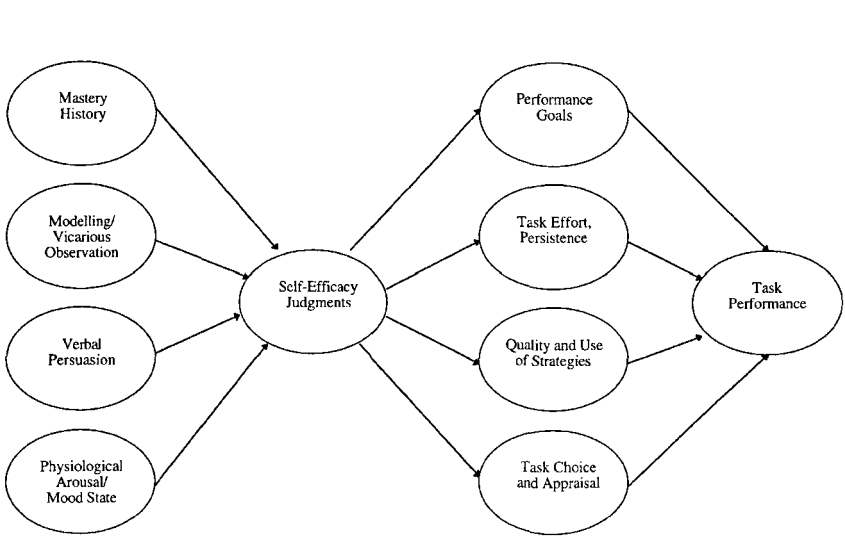


FIGURE 4.1 Sources and effects in self-efficacy theory. (Adapted from Bandura, 1997.)

effort that produces immediate positive performance consequences within a subportion of overall task engagement could bolster self-efficacy *during* continued task engagement. Moreover, there are some constructs and paths (e.g., post-task performance attributions that inform future and ongoing efficacy judgments) not depicted in this model in order to keep its explication clear. This model also includes an implied path from task performance back to mastery history (and other variables in the model), which transforms a hitherto *effect* (e.g., task performance) of a given self-efficacy judgment into a *cause* (source) of future self-efficacy judgments. The figure indicates that MSE judgments are formulated from the input of several sources and in turn have specific effects on task-related behaviors. The next two sections provide some details on the measurement and sources of MSE.

MEASUREMENT OF MEMORY SELF-EFFICACY

The approach to MSE measurement has bifurcated into (1) rationally derived sets of items based on Bandurian methodology (Berry, West, & Dennehy, 1989) and (2) factor-analytical scales composed of items from the Metamemory in Adulthood (MIA) questionnaire (Dixon, Hultsch, & Hertzog, 1988) and the Memory Functioning Questionnaire (MFQ) (Gilewski, Zelinski, & Schaie, 1990; Zelinski, Gilewski, & Anthony-Bergstone, 1990). Whereas the former measurement approach emphasizes the task-specific nature of MSE (Berry et al., 1989;

West & Berry, 1994), the latter approach emphasizes dispositional and dynamic beliefs about memory capacity and forgetting (Hertzog et al., 1987; Hertzog et al., 1990a; Hultsch et al., 1988). Both groups of researchers have demonstrated adulthood age differences in MSE as well as the predictive utility of MSE in relation to memory performance outcomes. Both groups have also examined the mechanisms by which MSE might influence memory performance, including task-related effort and strategy usage, and individual differences in performance prediction and vocabulary skills.

The primary distinction between these two lines of research, then, is methodological, although there are points of conceptual departure as well. Measures of MSE derived directly from self-efficacy methodology (Bandura et al., 1980; Bandura et al., 1982) have operationalized MSE as a memory evaluation judgment tied to a specific memory task (e.g., remembering names, directions, locations). This approach is based on hierarchically arranged subtask levels that range from low to high levels of mastery of a task goal and is exemplified by the 10-task, 50-item Memory Self-Efficacy Questionnaire (MSEQ) (Berry et al., 1989; West & Berry, 1994). Respondents make binary decisions (Yes or No) and confidence ratings (10–100% confidence) for each task level, as in the following sample items from the MSEQ:

If someone read the list to me twice, I could remember the names of 4 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If someone read the list to me twice, I could remember the names of 6 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If someone read the list to me twice, I could remember the names of 8 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If someone read the list to me twice, I could remember the names of 10 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If someone read the list to me twice, I could remember the names of 12 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

The number of yes responses are summed across the 5 items for each of the 10 tasks, and 10 summary scores labeled self-efficacy level (SEL) are retained for

analyses. Likewise, the confidence ratings across item and task levels are averaged to yield 10 summary scores labeled self-efficacy strength (SEST). Figure 4.2 displays the MSEQ measurement scheme. For path analyses of the relation of self-efficacy to performance with one or more mediating variables (e.g., Bandura & Jourden, 1991; Bandura & Wood, 1989), SEST scores are the preferred measure because they are based on a larger range of possible responses than are SEL scores, therefore yielding a more sensitive measure (Bandura, personal communication). However, both types of scores are useful indicators of absolute levels of perceived competence and confidence and have been used to examine mean age differences in MSE (Berry et al., 1989; West & Berry, 1994).

In contrast to the MSEQ approach, Hertzog and colleagues have used factor-analytically derived MSE scales from the MIA and MFQ questionnaires (e.g. Hertzog, Hultsch, & Dixon, 1989; Hertzog, Dixon, & Hultsch, 1990b). They define MSE as a "highly schematized system of beliefs regarding one's ability to use multiple types of memory in various contexts" (Hertzog et al., 1990a). This system includes all beliefs that could be brought to bear on memory evaluations, including beliefs about one's own memory abilities and capacity, how the self responds affectively to memory tasks, and how memory changes over time. Perhaps the biggest difference between MSEQ MSE and MIA MSE is that MSEQ items assess self-confidence in one's ability to perform specific memory tasks, whereas MIA items assess self-evaluations of one's general competence or ability across many different memory domains and tasks. The MIA is comprised of 108 items rated on 5-point Likert scales from "agree strongly" to "disagree strongly." A sample item from the MIA capacity subscale (which appears to be the most consistent marker of the MIA MSE subscales) is "I am good at remembering the content of news articles and broadcasts" (Dixon et al., 1988). Note that this item

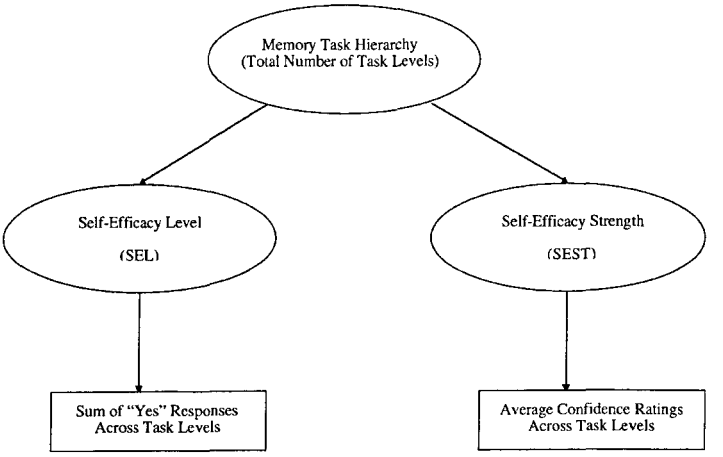


FIGURE 4.2 Self-efficacy measurement.

is combined with such items as "I have no trouble keeping track of my appointments" and "I have no trouble remembering where I have put things" for an aggregate MIA capacity score, illustrating the cross-domain nature of the MIA MSE measure.

Research that combines the two measurement approaches (Gardiner, Luszcz, & Bryan, 1997; Luszcz & Hinton, 1995) indicates that both levels of measurement have predictive utility. Bivariate correlations between MSE and recall reported by Luszcz and Hinton indicate that the Bandurian MSE measure (r^2 = .52) accounts for more variance in recall scores than does the MIA MSE (capacity subscale) measure (r^2 = .06) by a factor of almost 9. The continued use of both MSEQ and MIA measures in MSE research will help to clarify the meaning and construct validity of MSE and should move MSE research away from a mostly metamemory-measurement emphasis toward the field of social cognition. The Bandurian model employed by Berry and West is particularly amenable to expansion into this territory because we assume that the four sources of efficacy information share conceptual similarities with constructs and methods (e.g., schemata, affect, person perception, stereotypes, in-group biases) from social cognition. This assumption awaits empirical tests in our research programs and is discussed further in the closing section of this chapter "Future Research Directions").

SOURCES AND EFFECTS OF MEMORY SELF-EFFICACY JUDGMENTS

Self-efficacy judgments for a particular task are constructed from myriad sources (see Figure 4.1), including (1) *mastery,* the structure, content, and pattern of past successes and failures; (2) *modeling,* the observation, adoption, and internalization of the actions of other people; (3) *verbal persuasion,* the encouragement, advice, feedback, ridicule, admonitions, etc., received from other people; and (4) *physiological arousal and mood state,* the internal states of physiological or psychological excitation, inhibition, apathy, anxiety, etc., experienced in a situation (Bandura, 1997, Chapters 3 and 4). These four sources shape self-efficacy judgments, which in turn affect task-engagement processes and outcomes. High self-efficacy is related to high, proximal performance goals (Locke & Latham, 1990), greater persistence toward task completion (Cervone & Peake, 1986), better strategy usage (Bouffard-Bouchard, 1990), greater perceived choice (Betz & Hackett, 1986), and higher task effort (Berry, 1987).

Mastery experiences entail the cumulative history of one's engagement with a particular task, obstacle, or activity. In each successive enactive experience, the organism receives internal and external feedback regarding absolute and relative levels of mastery attainment. Recent empirical work by Sanna and Pusecker (1994) demonstrates self-efficacy can be manipulated by performing difficult versus easy items (on a word-association task) and that self-efficacy

interacts with performance feedback (experimenter-provided feedback or no feedback). Specifically, higher self-efficacy expectations were obtained from subjects who worked on easier (vs harder) word-association items in a pretest phase. Moreover, performance scores on the word-association test were predicted by a Self-Efficacy × Feedback Condition interaction, such that high self-efficacy subjects in the experimenter-provided feedback condition answered more items correctly than did low self-efficacy subjects in the experimenter-provided feedback condition. These results suggest that self-efficacy judgments can be predicated on task experience and, further, that self-efficacy interacts with self-evaluative concerns about performance: Efficacy effects on performance were greatest in the condition in which subjects were led to expect explicit feedback on performance. This research supports the influence of mastery experience as an important source of efficacy information. The overall valence of performance evaluations can be positive, negative, or neutral, but appraisal of the stored, cumulative record of experiences will depend on the subjective state of the individual approaching and during task engagement. Moreover, temporal, social, and affective variables influence interpretations of mastery records: An individual might be quite pleased privately with his or her work accomplishments on one day but view them more harshly and self-critically on another day in a public setting.

Each of the four sources of efficacy information comprise some form of social or situational information. Mastery experiences are often judged in relation to a social-referent standard, such as peer groups or age groups. Arousal may be heightened or attenuated positively or negatively in the presence of onlookers/observers to performing a memory task. Modeling (or vicarious observation) and verbal persuasion are the most directly social sources of self-efficacy information. Modeling involves the discernment and adaptation or rejection of other people's relevant behavior. (It could be argued that the self serves as a model, either at a younger age or as a self "ideal," but this argument is not developed here.) Verbal persuasion (or dissuasion) comes directly from others, although again, one could talk oneself into or out of attempting a challenging task. These two sources probably share common variance as sources of external feedback. For example, one might look to one's immediate social group (i.e., friends) for memory modeling information as well as attend closely to the verbal feedback it offers.

Physiological arousal is a fourth source of efficacy information. The effects of anxious arousal or mood state may operate only initially on self-efficacy judgments at points of task appraisal and performance anticipation, or the effects may be operative throughout a memory task and fluctuate as a function of ongoing performance feedback. However, the effects of anxiety on MSE may be more reactive if an initially nonanxious person becomes anxious during performance of a challenging, difficult memory task. In research settings, it is also possible that self-corrective or experimenter feedback over multiple trials would enhance or decrease anxiety, depending on the valence of the feedback.

SUMMARY

Self-efficacy theory and methods provide a rich theoretical network of testable, falsifiable hypotheses. Some hypotheses have received strong empirical support, such as those applied to achievement domains, including mathematics (e.g., Pajares & Miller, 1995), reading (e.g., Schunk & Rice, 1987), and writing (e.g., Zimmerman & Bandura, 1994). Research on mediational effects supports the reciprocal nature of self-efficacy and goal setting/attainment, although not equivocally (Mathieu & Button, 1992). The theoretical strengths and empirical yield of mainstream self-efficacy research have guided our MSE research efforts. This work, along with other MSE research, is described in the next section ("Status and Critique of Memory Self-Efficacy Research"). Research on questionnaire measures of memory control, complaints, concerns, and subjective memory beliefs (e.g., Lachman, Weaver, Bandura, & Elliott, 1995; Hermann, 1982) is not reviewed here. Although a large body of research is related derivatively (memory predictions), tangentially (memory complaints, memory beliefs, memory controllability), or superordinately (metamemory, metacognition, self-regulation) to MSE, the focus in this chapter is on work with close conceptual and/or methodological ties to self-efficacy theory. Thus, the work to date can be characterized as having two major emphases: (1) description of age differences in MSE and (2) the predictive and explanatory validity of MSE as a mediator of adulthood age differences on memory performance tasks. MSE is important because of its influence on how memory tasks are perceived, evaluated, and enacted. Empirical work has demonstrated that MSE declines in adulthood and has a positive effect on memory performance (Berry et al., 1989; Hertzog et al., 1990b; Luszcz & Hinton, 1995). The next section presents and critiques research on MSE in relation to age, predictive validity, and mediating effects.

STATUS AND CRITIQUE OF MEMORY SELF-EFFICACY RESEARCH

One of the most established conclusions in the cognitive aging literature is that memory declines with age (see Salthouse, 1991; Verhaeghen, Marcoen, & Goossens, 1993). This conclusion holds across diverse laboratory tasks (e.g., words, texts, pictures, drawings, object locations, numbers, names–faces, activities), encoding conditions (strategy instruction, incidental and intentional orienting tasks), and retrieval instructions (recall and recognition, implicit and explicit, free and cued recall). The *explanatory* mechanisms by which age influences memory functioning have been discussed from MSE, metamemory, and metacognitive perspectives (Berry & West, 1993; Berry, Acosta, Baldi, Burrell, & Rotondi, 1994; Cavanaugh & Green, 1990; Cavanaugh, Morton, & Tilse, 1989; Hertzog & Hultsch, in press; Hertzog & Dixon, 1994) and in the field of social cognition (Cavanaugh, Feldman, & Hertzog, 1998). These approaches examine

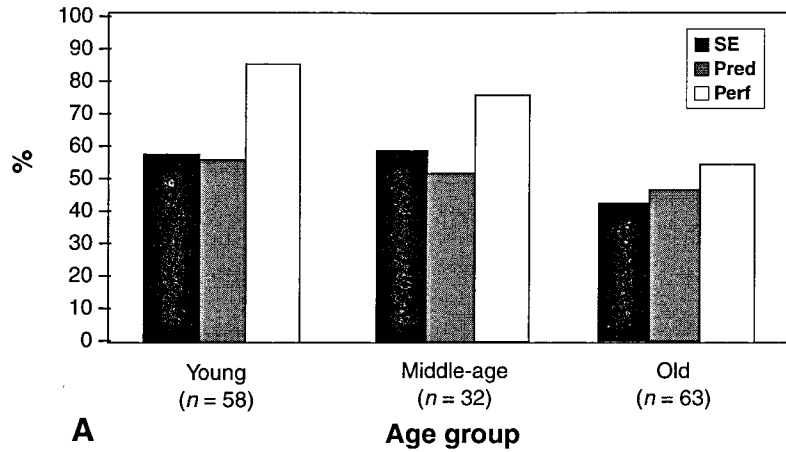
knowledge and beliefs about memory; self-regulation of memory skills and affect; age differences in knowledge, beliefs, self-regulation, and self-knowledge; and the relation of these factors to overt memory behavior.

AGE DIFFERENCES AND PREDICTIVE VALIDITY OF MEMORY SELF-EFFICACY

Most studies on MSE and aging have used samples of young and old adults and have found negative age differences between these two groups (Berry et al., 1989; Berry, West, & Cavanaugh, 1996; Gardiner et al., 1997; West, Dennehy-Basile, & Norris, 1996). Conclusions about the developmental nature of MSE, such as its relative salience and impact at different ages, are tenuous because although middle-aged adults have been included in MSE research designs (Berry, Thompson, Bryant, Hambrick, & Drew, 1998; Hertzog et al., 1990a; Hultsch, Hertzog, & Dixon, 1987; Ryan & See, 1993), curvilinear age effects have not been given as much explanatory emphasis as have the negative linear age effects obtained. For example, Berry et al. (1998) found that middle-aged adults reported higher MSE SEST for text recall than did younger and older adults who had comparable text MSE SEST scores. On a word-recall task, however, younger and middle-aged adults had comparable and higher MSE SEST scores than those of older adults. Figure 4.3 displays these results.

Differential patterns of age effects on MSE SEST scores were also obtained by Berry et al. (1996). Age differences for MSEQ MSE and for MIA MSE were all generally negative but not always linear. On some scales, younger adults reported higher MSE than did middle-aged and older adults, but on other scales, younger and middle-aged adults reported higher scores than did older adults. The eight memory tasks displayed in Figure 4.4 all yielded significant negative linear effects, but for some tasks (e.g., Grocery—recalling items from a grocery list), younger and middle-aged adults had comparable scores; both were higher than older adults' scores. Moreover, on the phone number recall task (Phone), all three age groups had significantly different MSE SEST scores. In the same study, Berry et al. reported that the factor structure of MSE may not be age invariant. In exploratory research on a sample of 489 adults between the ages of 18 and 90 years, factor analyses of the eight MSEQ subscales and the seven MIA subscales yielded a first factor composed of all eight MSEQ subscales for all age groups. The MIA subscales that loaded on the first factor (i.e., with the MSEQ scales) varied by age group: Anxiety, for younger adults; Change and Capacity for middle-aged adults; and Change, Capacity, Locus, and Anxiety for older adults. Table 4.1 displays these factor loadings for MSEQ and MIA subscales by age group. For the total sample, all eight MSEQ MSE subscales and MIA Change and MIA Capacity subscales showed good convergence of factor loadings on the first factor (MSE) of the solution (see Table 4.2).

In other research, West et al. (1996) found that MSE–performance relationships were higher among younger than older adults, particularly for laboratory memory tasks, but Berry, Geiger, Visocan, and Siebert (1987) found that MSE



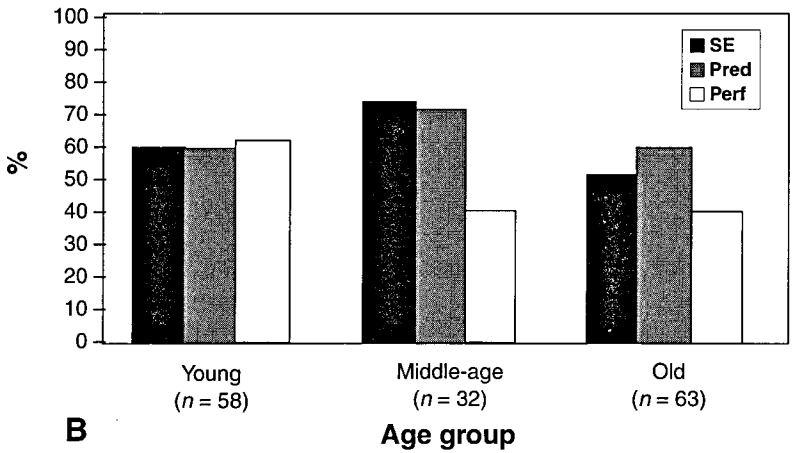


FIGURE 4.3 Age differences on self-efficacy strength (SEST) ratings of (A) word and (B) text recall. SE = self-efficacy; Pred = prediction; Perf = performance.

and recall were significantly correlated among older but not younger women. Luszcz and Hinton (1995) reported results that corroborated those of Berry et al. (1987) in that MSE scores explained more variance in the memory scores of older than younger adults. Similarly, Berry et al. (1994) found that models of the mediating effects of study time and strategy use on MSE–performance correlations were stronger for older than younger adults, as indicated by the overall variance explained by the models. Elsewhere, Berry and West (1993) have argued that MSE–performance relationships *should* be strongest for older adults as a group

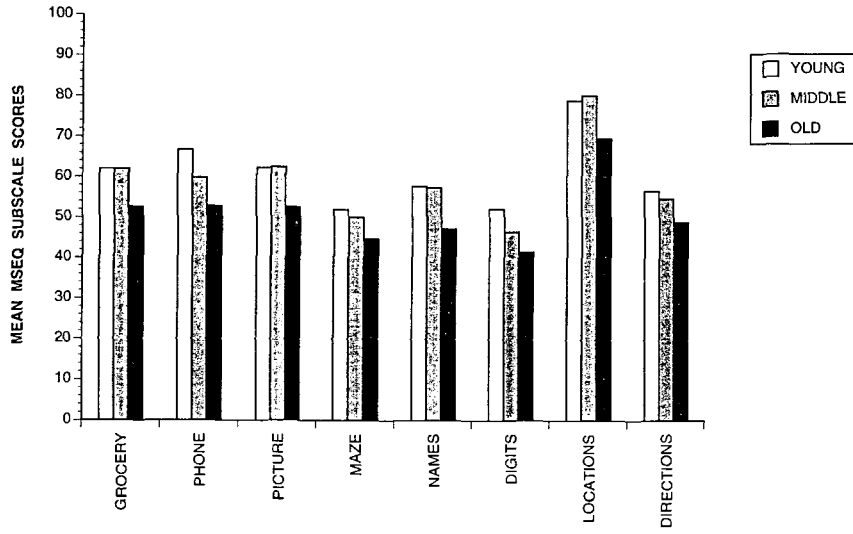


FIGURE 4.4 Age differences on self-efficacy strength (SEST) ratings of eight memory tasks. MSEQ = Memory Self-Efficacy Questionnaire.

because they are more concerned with memory functioning and losses than are younger adults. Perhaps older adults are more "memory schematic" (Cavanaugh et al., 1998) than are younger adults, which would suggest that memory functioning carries more personal importance for older adults and yields more accurate indicators of memory self-knowledge and evaluation.

The variable magnitude and patterning of MSE correlations with performance and performance mediators across age groups should be addressed in systematic, controlled research designed to determine when, why, and for which age groups MSE predicts performance. A memory system in flux at midlife seems particularly worthy of research attention, as middle-aged individuals begin facing the task of balancing losses and gains in cognitive (and other) domains (Baltes, 1987). How the individual compensates for or adapts to developmental changes, including fluctuating memory abilities, will depend partly on his or her beliefs about the nature of aging in general and his or her own experience of it in particular. To the extent that memory ability is important to the sense of self, adapting to a changing system will become a central developmental issue (Allport, 1955).

Definitive empirical work on MSE and aging has provided persuasive evidence that MSE is a developmentally relevant construct that predicts memory performance in adulthood (Berry et al., 1989; Cavanaugh & Poon, 1989; Dixon & Hultsch, 1983a, 1983b; Hertzog et al., 1987; Hertzog et al., 1989; Hertzog et al., 1990b; Hultsch et al., 1988; Rebok & Balcerak, 1989; West & Berry, 1994). This

TABLE 4.1 MSE and Knowledge Factor Loadings for MSEQ and MIA Scales by Age Group

	Young		Middle		Old	
Factor	MSE	KNW	MSE	KNW	MSE	KNW
MSEQ						
Names	.847	.084	.802	.171	.820	.168
Directions	.765	−.001	.718	−.210	.689	.167
Maze	.746	.042	.761	.022	.774	.079
Grocery	.734	.120	.784	−.019	.720	.062
Pictures	.692	.070	.652	.151	.654	−.085
Digits	.651	−.056	.778	−.098	.759	.127
Locations	.622	.013	.588	−.089	.661	−.061
Phone	.606	.106	.625	.068	.691	.225
MIA						
Anxiety	−.313	−.047	−.434	.614	−.721	.331
Locus	.053	.722	.351	.550	.420	.416
Achievement	.106	.717	.116	.787	.049	.787
Change	.189	.611	.474	−.238	.682	−.146
Task	.001	.542	−.159	.589	.107	.475
Capacity	.468	.487	.541	−.283	.681	.063
Strategy	−.259	.417	−.044	.594	−.223	.605

KNW = knowledge; MIA = Metamemory in Adulthood; MSE = memory self-efficacy; MSEQ = Memory Self-Efficacy Questionnaire.

TABLE 4.2 MSE and Knowledge Factor Loadings for Total Sample

Factor	MSE	KNW
MSEQ		
Name	.825	.079
Maze	.756	−.001
Grocery	.755	.012
Directions	.730	−.080
Digits	.718	−.047
Pictures	.674	.048
Phone	.662	.121
Locations	.637	−.056
MIA		
Capacity	.613	.052
Change	.541	.156
Achievement	.128	.775
Task	.063	.643
Strategy	−.142	.615
Locus	.330	.531
Anxiety	−.438	.473

KNW = knowledge; MIA = Metamemory in Adulthood; MSE = memory self-efficacy; MSEQ = Memory Self-Efficacy Questionnaire.

relationship holds for word, text, and digit span recall tasks, but future research should identify the memory tasks for which MSE has the greatest and least predictive utility. If self-efficacy (Berry & West, 1993) and social cognitive (Cavanaugh et al., 1998) theories of MSE are viable and robust, the predictive validity of MSE should vary by task, from person to person, and over time (i.e., developmentally).

MEDIATING EFFECTS OF MEMORY SELF-EFFICACY

Research on the processing mechanisms by which MSE influences memory performance has lagged behind that of age differences, MSE–performance correlational research, and MSE measurement. This is understandable given the need to establish valid and reliable measures of MSE that yield consistent age differences and are significantly related to memory performance processes. Bandura's hypothesis that self-efficacy operates through effort and persistence (see Figure 4.1) has been tested in a series of studies by Berry and colleagues. The results of these studies are mixed: Berry (1987) found that task study time mediated the MSE–performance (word recall) relationship among older women ($N = 120$) with complaints of memory. The women completed a word-recall MSEQ and then studied concrete nouns, each word printed separately on a small white card. The size of the word set for each participant was determined by a baseline measure taken before the performance trial; the performance word-recall sets ranged in size from 14 to 35 words. Subjects were instructed to study the words for as long as they wished (up to a maximum of 20 minutes) in order to recall as many as possible. Following study, subjects informed the experimenter when they were ready to attempt recall, at which time the experimenter recorded study time, collected the word set, and recorded the participants' responses (i.e., words recalled aloud). A path analysis of the data indicated that when study time (task effort) was added to the regression equation that predicted word recall from MSE, the standardized beta coefficient for the path from MSE to word-recall performance decreased from .42 to .19, indicating a partial but not total mediating effect. Overall, study time ($pr^2 = .30$) and MSE ($pr^2 = .17$) explained significant and unique proportions of total memory variance: $R^2 = .48$, $p < .0001$. Berry concluded that MSE has indirect effects on word-recall performance through study time but may also have direct effects on word-recall performance and/or additional indirect effects on variables (e.g., strategy use) that were not measured in this study.

In a follow-up study to Berry (1987), younger and older women without memory complaints (Berry et al., 1987) were tested, with less conclusive effects observed regarding the mediation of MSE and word-recall performance by task effort. Specifically, MSE and performance were significantly correlated in the older sample ($r = .58$, $n = 30$), but not the younger sample ($r = .10$, $n = 30$). For younger adults, study time was significantly related to MSE ($r = .40$) and to memory performance ($r = .66$), but neither of these relationships was significant

for the older adults (for both, $r < .09$). Taken together, the results of Berry (1987) and Berry et al. (1987) suggest that individual differences and age differences in self-reported concerns of memory ability differentially affect MSE and its effects. As suggested by Cavanaugh et al. (1998) and Berry and West (1993), and consistent with self-efficacy theory, the strongest effects of self-efficacy on task engagement and performance outcomes should be obtained among individuals for whom memory functioning (and concomitant worries) is important and integral to their sense of self.

In other tests of mediation effects, Berry et al. (1994) reported significant effects of MSE on study time and strategy use as mediators of word-recall performance, but these relationships varied as a function of age group and effort type: Stronger mediating effects were obtained overall for study time versus strategy use measures of task effort, and more overall variance in recall scores was explained in the path models for older (e.g., $R^2 = .60$ for study time mediation model) than for younger (e.g., $R^2 = .25$ for study time model) adults. Finally, Berry et al. (1998) found differential effects of MSE on recall across domains: MSE was significantly related to word recall but not text recall in a sample of 156 adults between the ages of 17 and 86 years. For word recall (see Figure 4.5), MSE and memory ability (Wechsler Memory Scale—Revised [WMS-R]) predicted performance scores initially, but in the final equation with task study time and self-reported strategies partialled, MSE became nonsignificant, suggesting that it operates through task-engagement variables (study time and strategy use).

Other process-oriented MSE research includes the "upgrading effect," wherein correlations between predictions and performance are higher following task experience than those calculated on pretest prediction data (Hertzog et al., 1990b; Hertzog, Saylor, Fleece, & Dixon, 1994; West et al., 1996). These data revive arguments found in earlier research literature that self-efficacy beliefs are not antecedent to but, rather, are consequent to performance outcomes (Lachman & Jelalian, 1984; Lachman & Leff, 1989; Luszcz & Hinton, 1995). The positive effects of task experience on MSE ratings are not inconsistent with self-efficacy theory. Self-efficacy judgments are formed from several sources, including immediate and distal past performance experiences and trials (see Bandura, 1997). It is critical to remember, however, that self-efficacy is not simply a dispositional reflection of past mastery: It is situationally determined and has its greatest impact for tasks that are overly challenging, anxiety provoking, and *unfamiliar.* Strict empirical tests of this theoretical claim must be made in order to answer the chicken–egg question that won't go away: Does self-efficacy predict performance or does performance predict self-efficacy? This question is simplistic and its answer is yes. The direction of causality depends on the situation, the person, and the task, as well as the time frame. The temporal patterning of efficacy-performance-efficacy relationships in short-term (multiple trials within one test session) and long-term (longitudinal analyses of change data) research designs warrants further study. It is encumbent on

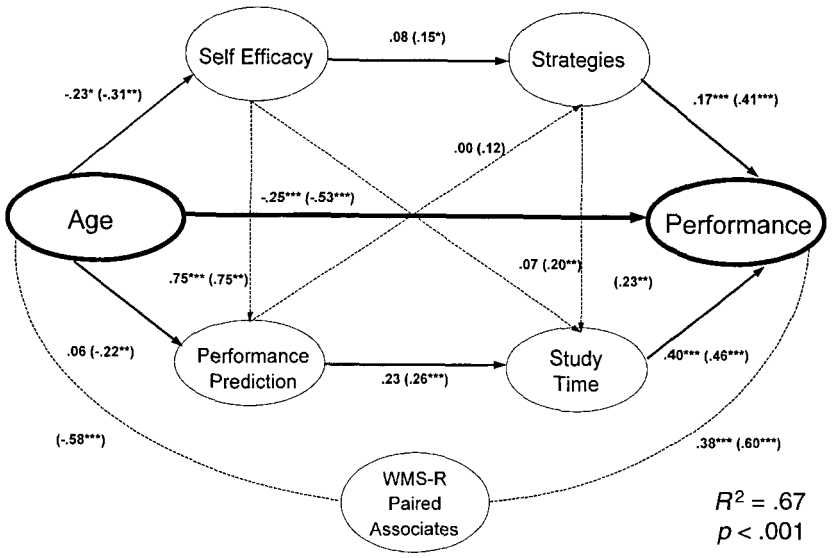


FIGURE 4.5 Path analysis model of age, self-efficacy, ability, task-engagement, and word recall. WMS-R = Wechsler Memory Scale—Revised.

MSE researchers to clearly specify when MSE is a cause and when it is an effect of memory ability and performance.

To my knowledge, research on physiological task arousal during MSE-performance trials has not been conducted. Questionnaire measures of anxiety yield mixed results (Davidson, Dixon, & Hultsch, 1991; Drew & Berry, 1996; Hertzog et al., 1990b). Davidson et al. found that state and trait anxiety predict memory performance, and Hertzog et al. reported significant correlations between metamemorial trait anxiety and MSE. Drew and Berry found that both MSE and a state measure of anxiety correlated significantly with word recall but that metamemorial trait anxiety and generalized trait anxiety did not. In a hierarchical regression analysis that predicted word recall from age, MSE, and state and trait measures of general anxiety and memory-specific anxiety, only age (age range, 53–88 years) and MSE significantly predicted word-recall performance at the final step in the regression. Although it is tempting to suggest from these results that age and MSE effects on performance were mediated by anxiety, the statistical power of this study was limited by a small sample size (N = 61). Clearly, questionnaire measures of anxiety and mood are important sources of data, but this line of research would be more informative if physiological measures of anxiety (e.g., skin conductance, heart rate) were collected concurrently with multiple measures of state and trait anxiety, general and specific memory anxiety, MSE, and memory performance throughout an entire

testing session. Although enactive experiences are the strongest sources of efficacy information (Bandura, 1997), the anxiety and arousal that accompany each masterful or failure experience may become coregistered or encoded with the outcome itself, becoming transformed into a multiplicative source of efficacy information.

In summary, solid headway has been made in measuring age differences in MSE and in documenting the effects of MSE on memory-related behaviors, including effort and strategy use, but particularly memory performance. The next section examines the potential of social cognition research methods for moving the field of MSE research even farther ahead.

SOCIAL COGNITION AS A CONTEXT FOR MEMORY SELF-EFFICACY RESEARCH

Self-efficacy theory (Bandura, 1977; 1986; 1997) squarely places the individual in his or her social milieu, yet empirical tests of MSE and aging (Berry et al., 1989; Gardiner et al., 1997; Hertzog et al., 1990b; Hertzog et al., 1994; Luszcz & Hinton, 1995; Rebok & Balcerak, 1989; West & Berry, 1994; West et al., 1996) have extracted the individual from the social and instead examined the contents in the head (and, to be fair, various task and timing characteristics). This practice has shortchanged the field by neglecting the *social processes* inherent in self-efficacy judgments, behavior, and outcomes. Moreover, most conceptions of MSE are devoid of personality structure, process, and content. This is a mistake, given what is known about personality–situation interactions as determinants of behavior (e.g., Cervone, 1997; Funder & Ozer, 1983; Mischel & Shoda, 1995; Shoda, Mischel, & Wright, 1993; Thorne, 1987). Social cognitive psychologists have implored us to put the person back in (the study of) behavior (Carlson, 1984). The resurgent interest in people in context and "ordinary personology" (Gilbert, 1998) provides a timely framework for reconsidering the social and personal nature of memory functioning and self-efficacy in adulthood and old age.

Social cognitive approaches to studying persons offer compelling suggestions regarding the return of MSE to its social context. Generally speaking, social cognition is how we make sense of self and others (Fiske & Taylor, 1991; see also Blanchard-Fields & Hess, Chapter 1, this volume). MSE judgments involve "making sense of" one's own changing and dynamic memory system and integrating this with social information regarding age-normative memory decline. Social cognitive research emphasizes mentalistic explanations, process analyses, and the cross-fertilization of cognitive and social psychological methodologies (Fiske & Taylor, 1991). These areas provide some connections between MSE and the broader field of social cognition.

Mentalistic explanations of behavior include two cognitive constructs—*attributions* and *schemas*—that have dominated the field of social psychology in the

twentieth century (Heider, 1958; Kelley & Michela, 1980; Weiner, 1985). The explanations that people give for their own and others' behavior are cognitive representations that allow them to make sense of cause-effect-cause sequences of behavior. In the memory domain, one might offer different explanations for self-forgetting ("I'm tired") versus other-forgetting ("She's slipping"). Causal attributions for forgetting (or remembering) vary by age and subject matter (Erber, Szuchman, & Rothberg, 1990), and depend on the individual's level of interest and skill (Blanchard-Fields, 1996).

Schemas are cognitive constructs that serve to organize and filter information (Alba & Hasher, 1983; Hastie, 1981; Markus, 1977). Implicit theories and stereotypes of aging constitute schemas for "old age" that can affect whether, how, and what kind of information is processed (Hummert, 1990, 1993; Levy, 1996; Levy & Langer, 1994; McDonald-Miszczak, Hertzog, & Hultsch, 1995; McFarland, Ross, & Giltrow, 1992). Positive or negative views of aging should have an impact on memory and MSE judgments—information about memory functioning should be processed in a manner consistent with schemas about self and others.

Social cognitive research also emphasizes process analyses. In MSE terms, appraisal of the demands of a memory task will be influenced by the individual's analysis of relevant information, as well as by the feedback received from coappraisers of the situation. For example, if a woman claims she cannot remember directions to a destination, her ability to retrieve or reconstruct that information will depend on whether she receives encouragement and tips from a sympathetic other or is admonished and criticized for her faulty memory. Analysis of the socially reciprocal processes that produce the outcome (destination remembered or not) in this example give insight into the facilitative and inhibitory functions of social feedback.

Finally, social cognitive research has adopted methodologies from cognitive and social psychology that could be applied fruitfully in MSE research. For example, reaction time and latency data are used routinely to measure the structure, contents, and processing outcomes of self-schems (e.g., Fekken & Holden, 1992; Mueller, Wonderlich, & Dugan, 1986; Neubauer & Malle, 1997; Siem, 1996; Strube, Berry, Lott, et al., 1986). These methods could be used to analyze the impact of memory self-schemas, aging self-schemas, and competency self-schemas on MSE (see Cavanaugh et al., 1998).

MEMORY SELF-EFFICACY AS A SOCIAL CONSTRUCT

The processes, contents, and expressions of memory are often social in nature. This notion was formalized by Bartlett (1932) who, after conducting a series of experimental social psychological studies on memory, claimed that "social organisation gives a persistent framework into which all detailed recall must fit, and it very powerfully influences both the manner and matter of recall" (p. 296). Dixon, Gagnon, & Crow (1998) have argued persuasively for the view that much of our cognitive activity is collaborative and occurs in social dyads (e.g., married

couples), and that this characteristic has special relevance for cognitive aging. If memory is to be taken as a socially constructed phenomenon, then when it serves as the referent for reflection and evaluation, as in the case of self-efficacy judgments and ruminations about memory phenomena, MSE *by definition* must be a social construction.

How is memory self-efficacy a *social* process? How is social information weighted differentially by individuals to yield self-efficacy judgments? The social contexts (groups, individuals, interpersonal relationships) that more or less shape the experience and storage of self-relevant events will depend on the goals and dispositions of the individual. Carlson (1980) showed that the bipolar personality dimensions of introversion/extraversion and thinking/feeling (from Jungian type theory) influence the affective tone and the interpersonal distance attached to remembered social interactions. In other work, "introverted-thinking" women had better digit span recall than did "extraverted-feeling" women who performed at a superior level on a face memory task (Carlson & Levy, 1973). Fong and Markus (1982) found that extravert and introvert schematics were more likely to choose schema-consistent questions from a list of extraverted, introverted, and neutral questions for the purpose of interviewing another person. These studies suggest that personality dimensions of "sociability" influence the content of memory recall, as well as the attentional focus to both self and other personality information that bears on social interactions (e.g., an interview with a stranger). In a related vein, Cohen and Ebbesen (1979) described the effects of goals and schema activation on person perception. Subjects were asked to either "form an impression" or to "describe the details" of the same target person. Those in the former group recalled larger units from the stream of behavior (displayed by the target) than did the latter group. This research demonstrates that the goals of the perceiver influence attention to different dimensions of a person/situation (i.e., part vs whole) with consequences for the nature and content of memory retrieval.

In a similar manner, personality probably interacts with the sources of information that yield MSE judgments. For those who look routinely to others as sounding boards for advice, feedback, and direction, information from the social realm will be processed differently (i.e., given more weight) than for those who are more inner-directed and self-reliant. Introspective individuals may engage more naturally and comfortably in temporal-comparative self-evaluations than in social-comparative evaluations. Classic social comparison theory (Festinger, 1954) states that individuals derive the most meaningful data for self-evaluations from similar others. Later research (Gastorf & Suls, 1978) refined this position by providing empirical support for the hypothesis that individuals compare themselves to similar others only to the extent that those others possess traits relevant to task performance. A review of reattribution training research (Forsterling, 1985) indicates that higher perceived similarity with models has a greater impact on receptivity to modeling information (e.g., attributions of lack of effort for failure).

MEMORY SELF-EFFICACY AS A DEVELOPMENTAL CONSTRUCT

MSE has particular relevance for midlife and older adults whose memory abilities may not be as good as they were in younger adulthood. When memory failures begin to occur repeatedly in the same situation, for the same task; when failures begin to have a familiar feeling; when they annoy, constrain, fluster, or worry us, they become data that can no longer be explained away as unsystematic error variance or noise but rather as possibly reliable (i.e., stable) indicators of a system in flux. This argument maps well onto a self-efficacy analytical template, but MSE analyses are not simply analyses of increasing, more regular failures of the operating system and its regulation. With age and development come self-knowledge and awareness, such that one selects those domains and contexts for which the behavioral repertoire is well suited—where one can thrive and perform capably and competently (Baltes, Dittman-Kohli, & Dixon, 1984; Carstensen, 1992; Hoyer & Rybash, 1994; Rybash, Hoyer, & Roodin, 1986). A social cognitive analysis of memory development and aging must account for negative and positive developmental changes as well as selection and compensation processes (Staudinger, Marsiske, & Baltes, 1993) as the organism experiences shifting operations and capacities in adulthood. The memory domains for which MSE explanations are most relevant and robust need to be identified: There may be universal domains (e.g., memory for proper nouns) that invoke MSE appraisals in all individuals at some point in development. Moreover, a differential model that identifies problematic memory domains at both intraindividual and interindividual levels would complement the universal approach, for a more complete developmental model of MSE appraisal.

MEMORY SELF-EFFICACY AS A PERSONALITY CONSTRUCT

In his classic treatise on the self as "the proprium," Allport (1955) made a distinction between facts about the self versus matters of importance to the self. He argued that habitual modes of behavior (or facts about the self) do not surface as matters of importance unless they are disrupted. At that time (i.e., when they become threatened as no longer automatically "self"), they become consciously important and attended to. Allport gives as example the use of one's native language as an habitual, unconscious part of the self that if suddenly threatened by "some foreign invader ... who forbid us to use our native language" (p. 40) would become a central, conscious, and utterly important aspect of the self. By analogy, this reasoning can be applied to the operation of MSE, especially when placed in a developmental framework. Specifically, MSE may lie relatively dormant as part of the proprium and personality during young adulthood, but if or when memory functioning becomes unreliable—less "habitual"—and thereby threatened, this may provoke self-efficacy appraisals of the system, and the seeds of "memory as

a matter of importance" are sown. At times, MSE is a conscious process as the self sizes up a situation and its ability to tackle it, but at other times, MSE operates with less awareness, as in situations in which the task is perceived as less challenging. In sum, MSE may operate on a continuum of consciousness, both over time (i.e., appearing as a more conscious part of the self in middle adulthood) and between domains of memory ability (i.e., some parts of memory functioning may never falter over a lifetime, remaining relatively "unconscious").

MEMORY SELF-EFFICACY ROOTS IN SOCIAL AND TEMPORAL COMPARISON PROCESSES

A social cognitive perspective on MSE encompasses the bidirectional flow of information between context and self over time. The self is organizer, reactor, and writer of its experience. This self takes into account the temporal components of memory functioning and the social milieu in which it operates, asking comparative questions such as "How am I doing relative to others?" and "How am I doing relative to my former (younger) self?" Suls and Mullen (1982) have argued that older adults may be more likely to engage in temporal than social comparisons (cf. Heckhausen & Krueger, 1993). McFarland et al. (1992) have issued a call for empirical analyses of temporal versus social reference points for older adults' characterizations of self. These questions and issues reflect the intraindividual and interindividual contexts of life-span development (Baltes, 1987). This line of self-reflective questioning probably also includes musings (and worries) about the future and possible selves (Baltes & Carstensen, 1991; Markus & Nurius, 1986) couched in goal-directed language such as "Where do I want (and not want) to be and how will I get there?" These past, present, and future characterizations of self-as-rememberer surely comprise components of a memory self-efficacy schema.

SUMMARY

A social cognitive MSE framework could integrate findings from developmental, personality, and sociotemporal comparison research in order to assess systematically the degree to which perceivers identify with models and others. Such a paradigm would entail detailed analyses of self, model, task, and situation characteristics, from the perspective of the dispositions, goals, standards, and needs of the self in a memory problem domain. Task demands should be analyzed in concert with an inventory of the skills of the individual who is to perform the task. Is there a match between task requirements and competencies of the individual? Do new skills need to be learned? To what features of a model does an individual attend: motivation? ability? skills? effort? age? attitude? Which models are available to the individual and which are rated as most important, instructive, and useful to him or her? Does a "previous" self at a younger age serve as a model, as in temporal comparisons? Are self-standards of performance realistic or unrealistic, given present levels of ability and opportunity? Is the social environment support-

ive or prohibitive toward attaining memory goals (Welch & West, 1995)? Self-schema research methods could be applied to answer these questions. For example, research participants could be instructed to respond to a variety of hypothetical models and/or real models in real situations using Like Me/Not Like Me endorsement rating and reaction time procedures (Markus, 1977; Markus, Crane, Bernstein, & Siladi, 1982; Strube et al., 1986). These data would assess the degree to which perceivers identify with and learn from others. Moreover, various "prototypes" of aging (ranging from competent/positive to incompetent/negative) could be developed and assessed with reaction-time endorsements to determine the extent to which subjects hold stereotypic views of aging of themselves. This approach is highly compatible with the modelling (vicarious observation) source of efficacy information.

FUTURE RESEARCH DIRECTIONS

Memory self-efficacy (MSE) has been investigated primarily among adults from the perspective of normative memory functioning, although little is known about the initial appearance of MSE concerns in midlife, or even younger adulthood, and its developmental course in later adulthood. This knowledge gap suggests that careful longitudinal, cross-sectional, and case history investigations of the emergence, evolution, and impact of memory concerns and reappraisals during adult development are needed to move the field forward. These methodological efforts will be most productive if they are driven by theory. MSE theory and methodology provide a good orienting framework for this goal, especially when integrated with compatible approaches from the fields of social cognition and life-span development.

Empirical studies of MSE have been rather mentalistic in nature and have focused on the internal process of judgments of efficaciousness from which behavioral action flows (Berry, 1987; Hertzog et al., 1990b; West & Berry, 1994). The antecedent and on-line processes comprising self-efficacy judgments are much more complex than what is apparent in single-occasion self-reports of efficacy given before or after memory tests in psychologists' laboratories. These MSE judgments are constructed contemporaneously in response to a demand on memory and they reflect current feelings of efficacy. What remains latent in these assessments is the schematic representation of the self-as-rememberer, constructed over years of experiences with a memory system used in myriad social, achievement, personal, and occupational settings. Surely this memory self-schema is activated when situational appraisals of memory ability are called for and drives "in-the-moment" self-efficacy judgments. The social-situational sources of MSE must be incorporated into a more holistic research approach to MSE.

Just as we accept the notion that memory is a constructive process (Bruner, 1994; Gergen, 1994; cf. Brewer, 1988), so must we consider MSE. In theory, MSE, like memory proper (cf. Alba & Hasher, 1983), is schematically based in its

architecture, materials, and functionality. Although this claim awaits empirical test, a conceptual argument could be made for recasting the classic sources and effects of self-efficacy judgments as schematically structured and driven. The sources, in particular, may be construed as filters that enable the processing of efficacy-relevant information. The premise that MSE is active and dynamic—driven by stored experience (past), immediate task context (present), and the goals and hopes of the individual (future)—is highly amenable to verification or disconfirmation via empirical analyses.

Insights regarding the verbal persuasion source of self-efficacy may be found in the anxious concerns of older adults about quotidia-forgetting as an incipient signpost of Alzheimer's disease (Cutler & Hodgson, 1996). Methods that systematically classify such concerns and their sources could inform MSE research. For example, the various sources of social feedback could be cast as a hierarchy of persons who provide verbal feedback to individuals about their memory functioning. The input of close peers, casual acquaintances, spouses/partners, siblings, offspring, doctors, other professionals, etc., are potentially salient sources of memory evaluation and should be examined closely, to test the validity of this component of self-efficacy theory. The verbal persuasion source of self-efficacy may be selected and weighted differentially, depending on the predisposition of the perceiver toward a particular persuader/dissuader. Different individuals will have different verbal feedback hierarchies.

Systematic, process-oriented studies of MSE that employ multimethod/multimeasure research designs that include developmental, personality, and social variables are called for. Most MSE research has focused on measurement issues to the exclusion of process issues. Research on the social, interpersonal, and intrapersonal sources of MSE is needed, together with the more cognitive, self-regulatory, and schema-driven processing effects that connect MSE judgments to memory-performance outcomes. The MSE-relevant attributions that people make for long-term memory changes (e.g., temporal comparisons) and contemporaneous memory functioning (e.g., "post-test" performance attributions in the lab and causal explanations/excuses in everyday life) should be investigated.

Studies of intraindividual changes in MSE are virtually nonexistent. Research on individuals whose MSE holds steady through adulthood versus those whose MSE becomes highly sensitive and reactive to even benign memory lapses would yield important insights. Such research would identify those individuals for whom memory functioning is intact and nonthreatening, and in turn, these individuals could be followed closely using case study methods in order to develop prototypes of "sucessful memory aging." This knowledge could serve as the basis for modeling interventions designed to allay serious concerns and negative affect attached to memory functioning among midlife and older adults. Questions regarding individual performance/competence standards and goals, versus those regarding normative memory functioning imposed by memory researchers, should be explored. The person who states that "I want to be the best in my social group—I pride myself on my memory" is suggesting a different sort of memory

self-schema than one who simply wants to maintain his or her own status quo regarding memory abilities.

A "PERSONS IN PLACES IN PROCESS" APPROACH TO MEMORY SELF-EFFICACY

MSE researchers might take their cue from Gilbert's (1998) argument to return to the study of "the ordinary" in people's lives. Do we really believe that when people are confronted with a memory-demanding task (e.g., retrieving a word, name, place, location, object, thought) and fail, they pause at the moment of task presentation and assess their abilities? (No.) Just how aware of self- and task-appraisal states are they? Is it important that they be aware? How conscious or unconscious are these processes? Are memory tasks really as "threatening" as self-efficacy purists would claim? When people fail to remember—when they forget—their reaction is probably more benign and they probably do *not* make a self-efficacy judgment per se (e.g., "This task would require all of my concentration with no distractions for the next 10 minutes for me to get it right and to be happy with my performance"). Rather, their reaction is probably more diffusely affective in nature, and possibly reflective as well.

CONCLUSIONS

To realize the full potential of MSE as an important adult developmental and cognitive aging research construct, MSE researchers need to move beyond their emphases on measurement and modeling. Questions about people in places in process—not methodology—should drive the research. It seems the most promising questions would center on the individual's sense of self immersed in his or her social world (Reed, 1994) and the meaning that memory in social relationships imparts (Gergen, 1994).

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