Associative and Dissociative Cognitive Strategies in Exercise and Running: 20 Years Later, What Do We Know?

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Association and dissociation (A/D) have been identified as important cognitive strategies in the literature on running and exercise. This paper is a comprehensive review of the 20 years of research in the area. Specific topics addressed include historical context, definition and terminology considerations, measurement and design issues, and findings as they pertain to performance, injury, and pain. Several research recommendations are made including change from using the term dissociation, use of multiple measurement methods, diversity of research designs, and study of topics, such as injury, exercise adherence, and emotionality, as they relate to A/D. Finally, practical findings indicate that association relates to faster performance, dissociation relates to lower perceived exertion and possibly greater endurance, and dissociation is not related to injury but association may be.

In 1977, William Morgan and Michael Pollock published a landmark study in a special edition of the Annals of the New York Academy of Sciences devoted to marathon running. They explored the psychological characteristics of 27 runners, a group that included world class athletes and college middle distance runners. Much of the article was devoted to psychological test results describing the personality profiles characteristic of this group. Key contributions came, however, from their findings obtained in interviews where they inquired about the cognitive strategies used by distance runners. Morgan and Pollock were surprised to find that this group of elite runners tended to use a strategy termed association. Associating runners “monitor sensory input, and adjust their pace accordingly, with the net result that ‘pain’ (quotes in original) is avoided” (p. 400). This differed from the so-called dissociative strategy used by nonelite runners. The “dissociative cognitive rehearsal” (p. 390) is aimed at “dissociating the painful sensory input” (p. 391). Whatever the exact theme of dissociative cognitions, they all served to direct

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attention away from the physiological signals being produced by the body and toward outside, distracting stimulation.

Since this initial work, association and dissociation (A/D) have been central to investigations of cognitive strategies employed by distance runners and other exercisers. As the fitness movement enters its third decade, interest in cognitive strategies for athletic performance remains high. Correspondingly, many empirical studies have addressed and continue to address A/D, using various samples, measurement strategies, and methodologies.

This paper will provide an overview and summary of the existing findings, offer informed criticism pertaining to methods and measures, and present ideas for future research directions. While we endeavor to be thorough, we do not intend to cover each study in detail nor do we intend to broadly cover the topic of cognition as it relates to exercise. Instead, the goal is to adequately present the current state of knowledge in A/D research. We will begin by discussing definitional issues, followed by an investigation of measurement and design matters. We will then look at how A/D relates to performance, injury, and pain. By way of conclusion, we offer our general evaluation and provide comments for the future.

To locate the studies for this review, we conducted computer searches of psychological, sport science, and medical databases, using the terms association, dissociation, running, exercise, cognitive strategy, internal focus, and external focus. Additionally, the reference citations in obtained articles were searched and any relevant studies retrieved. Through these methods, 35 articles were obtained.

**Definition Issues**

**Dissociation as Pathology**

Use of the term dissociation has led to some confusion. Since clinical psychologists diagnose and treat dissociative disorders, some have mistakenly assumed that dissociation during running implies something negative or perhaps pathological. According to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association, 1994), dissociation is “a disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment. The disturbance may be sudden or gradual, transient or chronic” (p. 477). In fact, the dissociative processes found in dissociative disorders and runners’ dissociative thinking may be similar. Both involve a loosening of cognitive structures so that perception of actual sensations may be suspended while cognitions are focused on other content. For example, dissociating runners may visualize themselves as children playing in the backyard and a dissociating patient may also experience events from earlier in life. Indeed, the motivation behind both cognitive experiences may be to escape something in the present stimulus environment, be that pain or monotony during a run or abuse by a perpetrator. However, dissociation as a clinical condition involves disturbances of memory, identity, or behavior that go well beyond even the more dramatic examples of dissociation while running. A further distinction between clinical dissociation and dissociation used by runners may be found on the dimension of controllability. Dissociating runners are quite capable of terminating or changing the dissociative state at will. Such is often not the case for those suffering from clinical dissociation.
One study aimed to investigate the relations between pathological measures of dissociation and using a dissociative cognitive strategy during running. Ogles, Lynn, Masters, Hoefel, and Marsden (1993-94) studied 131 marathon runners and found no significant relationship between A/D used by runners and standardized measures of daily dissociative experiences, image processing, and absorption. Since the latter are correlated with a wide range of psychopathology measures, the authors concluded that one explanation for the lack of significant relations was that runners do not demonstrate significant pathology or “negatively toned daydreaming” (p. 172). Researchers in this same study did find a relation between motives for running and one dissociation measure, the Bliss Scale (Wogan, 1991). Runners who were more motivated to run as a way of coping with troubling emotions had higher Bliss Scale scores. Although their motives for running predicted a measure of pathological dissociation, runners who endorsed this emotional coping motive did not, while running, engage in dissociative strategies at levels different from other runners. This suggests that running motives may have more important relations with pathological dissociation than does A/D as used during the run. Whatever the exact explanation, these findings indicate that runners who use a dissociative strategy when running are not disproportionately represented among those who engage in pathological dissociative experiences.

**Dissociation as Attentional Focus**

In part because dissociation has dual meanings, some researchers (Fillingim & Fine, 1986; Gill & Strom, 1985; Ogles et al., 1993-94; Udewitz, 1992) refer to runners’ cognitive strategies as internal and external focus rather than A/D, implying that differences in cognitive strategies do not reflect various cognitive processes but instead reflect differing foci of attention through similar processes. When attention is focused on the body, physical sensations, pace, and pain, the focus of attention is internal (i.e., association). When attention is focused on anything other than the body and internal sensations, the attentional focus is external (i.e., dissociation). The label attention focus avoids the pathological undertones that accompany dissociation. However, using the term attention has problems. When discussing attentional focus, the large body of perceptual psychology research regarding attention and perception is brought to mind (e.g., Cowan, 1988; Lambert, 1985), as is Nideffer’s (1978, 1986) sport-specific work. This basic psychological literature is relevant to the cognitive activities that occur during running, but generally, researchers have not utilized this in their conceptualizations. Additionally, internal versus external focus appears to oversimplify the complexity of runners’ cognitions. This is especially evident in the wide range of potential strategies that could be classified as external, such as counting objects in the environment, talking to a companion, daydreaming, solving problems, and actively fantasizing.

Selecting more precise terminology may be premature, especially considering the difficulties in monitoring and measuring runners’ thoughts. On the one hand, it may be better to use terms such as distraction or external focus to avoid psychopathology connotations. In exercise and running research, the essence of dissociation is attention that is focused away from physical activity and the physiological sensations that accompany it. Thus, it may involve cognitive processes that resemble experiences described in other contexts (clinical and nonclinical) as dissociation, but often it may be more similar to simple distraction or daydreaming. On the other hand, a simple shifting of foci may understate the complex...
processes involved in a disruption of internal sensations and perhaps consciousness, even if it is not classified as a pathological activity. Certainly, more research will facilitate empirical decision making about appropriate terms and definitions. We will continue to use the term dissociation in this paper because of its historical precedent and importance.

Measurement and Design Issues

Measurement

Concerns regarding measurement are of particular interest for A/D research because the object of inquiry (i.e., cognitions) is internal to the participant and not directly observable to others and because participants are engaged in physical activity when cognitions occur (though not necessarily when they are asked to record them. Table I provides an overview of the various methods and measures used in assessing A/D. More detail on representative studies is presented below.

Morgan and colleagues (Morgan, O’Connor, Ellickson, & Bradley, 1988; Morgan, O’Connor, Sparling, & Pate, 1987) performed a taped structured interview to gather A/D and other information. Runners explained “in as much detail as desired” (Morgan et al., 1988, p. 251) the thoughts they had during a typical training run. Cognitions were classified as A/D based on earlier definitions proposed by Morgan and Pollock (1977; see above). No information is presented regarding who made the classifications or on interrater reliability.

Several studies have utilized paper-pencil assessments of A/D. Okwumabua, Meyers, Schleser, and Cooke (1983) asked runners to view a list of cognitive topics and check those items that they thought about while running. Items were divided into A/D, and a single A/D score was obtained for each participant. In a separate study, the same researchers (Okwumabua, Meyers, & Santille, 1987) provided A/D definitions, and runners estimated the percentage of time that they used each strategy during the quarters of a 10-K race and for the entire race. Participants also briefly described the A/D content of their thoughts. Masters and Ogles (1992) also used this instrument in their study of AID and injury. Silva and Appelbaum (1989) developed the Running Style Questionnaire, a self-report instrument composed of 12 multiple-choice and 6 open-ended qualitative questions. Multiple choice questions required respondents to indicate the percentage of time during segments of a marathon that they attended to different bodily functions (association) or adopted a distractive strategy (dissociation). Finally, Tammen (1996) had participants rate on a 10-cm bipolar line whether they were focusing on the body (associative) or distracting thoughts (dissociative) during the run just completed.

In a rare study focused on measuring cognitive strategies, Brewer, Van Raalte, and Linder (1996) developed the Attentional Focus Questionnaire (AFQ). This instrument assesses how much runners think about certain activities along three dimensions (association, dissociation, and distress). Individual items are rated on the basis of how often the runner engages in this type of attentional focus. Authors reported adequate initial reliability and construct validity. Masters and Ogles (1996) used the AFQ to predict injury in runners.

Schomer (1986) took a different approach. He noted that previous studies did not assess thoughts during runs but instead relied on data from memory. A
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PP = Paper and pencil; SI = Structured interview; TR = Tape recording; Obj = Objective data; Sub = Subjective data; ER = Experimenter rated/categorized thoughts. The type of data distinction (Obj vs. Sub) was made based on whether the measure incorporated standardized methods of assessment. For example, the use of multiple trained raters with appropriate information provided regarding rater reliability would be considered an objective measure. In many studies there was not adequate information to be sure how the measure was handled. In these instances it was assumed that subjective methods were used. When a specific measure was identified by name it is reported here.
purpose of his study was to “avoid retrospective falsification” (p. 43). To do this, he fixed a microcassette recorder to runners and instructed them to say whatever came to mind while running. Recordings could be classified as A/D according to a precise scheme developed by Schomer. Experimentally blind research assistants performed ratings on the “most concise intelligible cognitive expression (sentence or phrase) that could be understood when isolated” (p. 47) and achieved 97.34% concordance.

This study was innovative because it captured runners’ thoughts while they were running and utilized a relatively precise coding system to rate these thoughts. However, the preponderance of associative thoughts during training runs contrasts with the rest of the literature (see below). This makes one wonder if the measurement method may have affected the runners’ thoughts or whether the classification system was biased toward association. Although the microcassette recorders were apparently comfortable to wear, introducing them into the run may have altered the natural cognitive processes. Further, verbalizing to a recorder while running presents substantial intrusion. Asking runners to continually report their thought processes forced them to remain vigilant about their thinking. This type of task could easily prevent dissociative experiences, which tend to be less analytic and more spontaneous.

Masters and Lambert (1989) used Schomer’s classification system with a more traditional, paper-pencil, retrospective method of collecting cognitive data. They found that while runners reported more association during the marathon, they tended to dissociate more in training—results that are consistent with other studies. Thus, in Schomer’s study, the method of collecting data—not the classification system—may have significantly influenced results.

Support for this interpretation was found in Sacks, Milvy, Perry, and Sherman’s (1981) study of 10 ultramarathon runners. Participants responded into a lightweight portable tape recorder to questions posed approximately every 3 hr by an investigator who bicycled alongside the runners. The authors suspected that runners were biased toward reporting associative thoughts. For example, runners often said they “could not remember” details of other types of thoughts (dissociative) even though they briefly mentioned them. While this method differs somewhat from Schomer’s in that an investigator was actually present during thought recording, the two are similar in that runners recorded thoughts into a tape recorder while running. Both suggest that more invasive methods may increase association reports.

In conclusion, measurement issues are extremely important in A/D research. Particular areas of concern are temporal proximity to the actual event, presence or absence of another person (researcher), invasiveness of the technique, instructional set, and method of recording thoughts (paper-pencil versus tape recording). Table I reveals that investigators tended to use subjective methods of assessing A/D. Investigators often determine in some unspecified manner the presence of A/D in either paper-pencil reports or tape recordings of thoughts. We recommend continued refinement of standardized assessment instruments, such as the AFQ or Schomer’s system, when used with interrater reliability checks. Alternatively, imprecise subjective assessments are strongly discouraged. The relative advantages and disadvantages of each particular instrument and method should be carefully considered in the design phase of future investigations. When possible, multiple methods of assessing A/D should be incorporated in the same study or in a series
of studies. The influence of measurement technologies may become clearer and, alternatively, A/D findings may gain strength if results are replicated across measurement methods.

**Research Design**

A/D studies have had different purposes and, consequently, different designs. Many are observational, with the goal being to describe the A/D phenomenon, provide information regarding the rate and nature of A/D occurrence, and offer information regarding correlations with other variables. Morgan and Pollock's (1977) study falls into this category. Ungerleider, Golding, Porter, and Foster (1989) investigated numerous demographic, motivational, and attitudinal correlates of masters runners. Masters and Lambert (1989) reported on the occurrence of A/D in training and in five sections of a marathon to track A/D occurrence throughout the event. They reported numerous correlations between A/D and motivations for marathon running, performance variables, and injury. Similarly, Masters and Ogles (1996) demonstrated that A/D scores predicted injury among marathon runners at 4-month follow-up.

Other authors have used A/D as an independent variable in designs that meet experimental criteria. For example, Johnson and Siegel (1992) instructed participants to use association, internal dissociation (i.e., remembering teachers' names), or external dissociation (i.e., conversing with two technicians) while riding on a cycle ergometer. Dependent variables included heart rate and ratings of perceived exertion. Similarly, Weinberg, Smith, Jackson, and Gould (1984) had subjects employ an associative, dissociative, or positive self-talk strategy during a 30-min run and a muscular leg-endurance task. Interestingly, authors of both studies believed that individuals had a difficult time internalizing and therefore adequately using the assigned cognitive strategies. Sachs (1984) drew a similar conclusion in his study, noting that many resisted adopting an assigned cognitive strategy, preferring to use their "habitual thought processes" (p. 294) instead. Okwumabua et al. (1983) also found that runners could not adopt an assigned cognitive strategy. This suggests that researchers who plan on using A/D as an independent variable need to develop strong methods that will induce participants to actually use and incorporate their assigned cognitive strategies. Simply instructing participants about a strategy is not sufficient to clearly test specific hypotheses (see Wrisberg, Franks, Birdwell, & High, 1988). Investigators should pilot study manipulations, carefully train participants in the cognitive strategies, and incorporate manipulation checks into their research designs.

By way of summary, much of the A/D research conducted with runners has been observational and correlational. Experimental studies have looked at the effect of A/D on various outcome measures, including endurance, affect, performance, and pain. Results of these studies will be discussed next.

A/D has been investigated from several research designs, thus indicating the relative maturity of this topic. This is impressive, given the relatively brief history of sport psychology.

**Performance Studies**

More than 20 studies have focused on investigating aspects of the relationship between A/D and some type of performance variable. The studies can be divided
on the basis of whether they used runners or had participants engage in some other task. First, we will briefly review the nonrunning samples research, followed by analysis of studies using running participants.

**Nonrunning Samples**

Several researchers have used laboratory conditions to investigate the effects of A/D on endurance tasks. Weinberg and colleagues (1984) found differences between groups instructed to use dissociation, association, positive self-talk, or no instructions on a leg-lift endurance task. Findings indicated that dissociation and positive self-talk groups held their legs out significantly longer than association and control groups. Similarly, Gill and Strom (1985) found that female volunteers performing a repetitious leg-lift task did better when employing an external focus (similar to dissociation) rather than an internal focus (similar to association). This study used a within subjects design and employed a manipulation check to determine whether cognitive strategies were used appropriately. Finally, Spink (1988) demonstrated greater endurance in a leg-holding task for participants in a dissociation with analgesic suggestions group (i.e., participants created a method of distraction and were told that this was effective at reducing pain) than for those in a standard dissociation or control group.

In a relatively complex leg-extension study, Weinberg (1985) utilized a $2 \times 2 \times 2$ (gender $\times$ self-efficacy [high, low] $\times$ cognitive strategy [dissociation, positive self-talk]) design. In this study, a manipulation check was included, which demonstrated that subjects in the high efficacy condition had higher success expectations than those with low efficacy. Unfortunately, no such checks were used for cognitive strategy. The efficacy factor produced a significant effect, indicating that individuals in the high efficacy condition held out their legs longer than the low efficacy group. Interestingly, there were no significant results on any of the main or interaction effects that included cognitive strategies. This study is quite informative because it raises the possibility that expectation or motivation (e.g., competition) may be the more potent cognitive variable(s) affecting endurance performance in these types of tasks. To the extent that expectancy and motivation have not been accounted for in other studies, they pose possible confounds to clear interpretation of results. Alternatively, the cognitive strategy manipulation in this study may not have been potent enough to produce group differences.

Rejeski and Kenney (1987) varied the task complexity of dissociative coping in a study using as the dependent variable the time that a participant could maintain an isometric contraction of 40% on a handgrip dynamometer. Rejeski and Kenney also assessed the effects of task preference on coping during a follow-up protocol. No differences were found between the simple and complex dissociation groups, with both tolerating fatigue better than controls did. In a second test, these authors found that individuals who preferred the simple task exhibited greater tolerance to fatigue in the simple condition than in the complex one. Rejeski and Kenney explained that for subjects who prefer a simple kind of dissociation, using complex dissociative strategies might be an aversive, stressful experience. Participants who preferred the complex task performed equally well in both conditions.

This representative sampling of studies indicates that dissociation is related to better endurance in laboratory-type endurance tasks. However, the possible confounds of expectations and motivations are generally not well accounted for and, as seen in the Weinberg (1985) study, may be significant. Using manipulation checks
is commendable but needs more widespread implementation. Applying the results from these studies to running situations is tenuous at best, but well-controlled laboratory investigations do provide the setting for valuable tests of theoretical constructs as they relate to A/D.

Interestingly, in a study of swimmers, Spink and Longhurst (1986) investigated associative and dissociative strategies among those engaged in the 400-m medley. The researchers concluded that using an associative strategy significantly reduced swim times compared to pretest and the dissociative condition. Association as it relates to faster performances will be highlighted again in the following section on running samples.

**Running Samples**

Two major questions have been addressed in the literature pertaining to A/D and running performance. First, is association or dissociation related to faster running? Second, do either of these cognitive strategies enhance endurance or affect perceived exertion in running events? Morgan and Pollock (1977) concluded that elite athletes, because of their physical superiority, tended to associate while running and consequently ran faster. Nonelite runners, on the other hand, dissociated as a means of enhancing endurance.

**Dissociation and Pace.** Generally, with notable exceptions, the relation between association and faster running on the one hand and dissociation and slower running on the other has been upheld. Silva and Appelbaum (1989) distinguished the top 50 placers from lower finishers at the United States Olympic marathon trials on the basis of their preferences for association, though these authors also noted that most runners used a combination of strategies in a flexible and adaptive manner. Masters and Lambert (1989) found that among a large sample of marathon runners, faster times were related to more associative thinking styles. Schomer (1986, 1987) found that body monitoring (essentially, association) was related to faster performances. Tammen (1996) studied elite middle and long distance runners and generally found that as running intensity increased, so did the use of associative cognitions.

In a more controlled experimental study using cognitive strategy as the independent variable, Saintsing, Richman, and Bergey (1988) found that an association strategy resulted in greater improvement in running times for a 1.5-mile run on a standard 400-m track than did dissociation, psyching-up, or control conditions. Alternatively, Okwumabua (1985) found no relation between cognitive strategy and finish times in a marathon. Pennebaker and Lightner (1980) demonstrated that runners performing on an 1,800-m cross-country trail ran faster than when placed on a 200-m lap course. The researchers believed that the cross-country condition provided greater external attention (essentially, dissociation) and that this accounted for improved running performances. So, while the research is not entirely consistent, the general trend suggests that association is related to faster performances.

Runners, regardless of skill level, generally prefer dissociation in training runs and association in races. This result has been confirmed in numerous investigations incorporating the findings from various samples studied in differing conditions (Masters & Lambert, 1989; Morgan & Pollock, 1977; Ogles et al., 1993-94; Okwumabua, 1985; Sachs, 1984; Summers, Sargent, Levey, & Murray, 1982). Only Schomer (1986) found a preference for association in training. An additional
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study (Okwumabua et al., 1987) furnished confusing information on this topic. Researchers reported that among their sample of runners, age 40 or older, individuals generally preferred association prior to and after a race but mostly utilized dissociation during competition. However, Okwumabua et al’s analysis of cognitive strategies by race quarters produced data demonstrating that association use was higher than dissociation in every quarter. Given the data collection method in this study, we might conclude that runners were inconsistent in their reports. They may have believed that they would use dissociation more during the race and thus filled out the prerace questionnaire in this manner. However, following the race, when they reported their actual thoughts, results may not have been what they expected.

Findings that faster runners and those in races prefer association while slower runners and those in training prefer dissociation are probably two sides of the same coin. Training runs are typically conducted at a pace somewhat slower than that of an actual race, particularly for nonelite runners. Some authors (Masters & Lambert, 1989; Sacks et al., 1981) have noted that during a slower pace, runners may be able to engage in more mental activity or creativity (see injury and pain studies).

**Dissociation and Perceived Exertion.** The effect of A/D on endurance and perceived exertion has been a significant area of focus for performance studies. In a treadmill study, Pennebaker and Lightner (1980) found that participants reported less fatigue and accompanying symptoms when their attention was directed toward distracting sounds compared to when they attended to their own breathing or were not distracted. Utilizing a similar design, Fillingim and Fine (1986) had runners perform on an indoor track and found that they reported significantly fewer symptoms, particularly ones related to exercise, in an external focus condition versus internal attention or control conditions. Stones (1980) also found that running with attenuated visual input (similar to dissociation) resulted in decreased fatigue relative to actual pace. Johnson and Siegel (1992) found that participants in an association condition reported higher ratings of perceived exertion than control, internal dissociation, or external dissociation participants. Wrisberg and colleagues (1988) noted that individuals perceived postexercise exertion to be higher when they were in a self-focus condition (watching themselves in a mirror and listening to their breathing; association) than when they were in an external focus state (watching and listening to a movie; dissociation). Harte and Eifert (1995) also reported similar findings, and Schomer (1986) noted a strong positive relationship between association and perceived exertion. Masters (1988), on the other hand, found no relation between perceived exertion and cognitive strategy. However, his results appear to have been influenced by a ceiling effect on the exertion variable, thereby reducing the likelihood of significant findings. Thus, we can conclude that dissociation is related to less physiological awareness and lower perceived exertion ratings.

In their original article, Morgan and Pollock (1977) noted that anthropological accounts showed that Tibetan monks could perform extraordinary physical accomplishments of endurance when using cognitive strategies similar to dissociation. This led to the idea that dissociation may be a primary method of enhancing endurance during runs. Unfortunately, the evidence on this is very mixed. Sacks and colleagues (1981) had difficulty assessing the cognitive strategies of runners in a 100-mile race. While the cognition sample that they collected was primarily associative, they believed that a careful reading of the data indicated that dissociative or meditative states were also commonly experienced. Since these findings
were really only suggestive, no firm conclusions could be drawn. Using a very different approach, Morgan, Horstman, Cymerman, and Stokes (1983) found that a dissociation cognitive strategy condition resulted in 32% longer endurance on a treadmill compared to a control condition. This study is open to significant criticism, however, because the dissociation instructions appear to be heavily laden with experimental demand and expectancy. As noted earlier, these variables may play a significant role in affecting performance.

Alternatively, Wrisberg and colleagues (1988) found nonsignificant trends toward longer endurance during self-focused (association) activity than during externally focused (dissociation) exercise for both women and men. Thus, while dissociation seems clearly related to enhanced endurance when the dependent variables tap physical strength in a very limited fashion (e.g., leg-lift tasks), the picture is unclear when running time or distance is the outcome variable.

### Injury and Pain Studies

Morgan and Pollock (1977) reported that elite runners, because of their physical superiority, could “afford” (Morgan, 1980, p. 300) to associate, but nonelite runners needed to use dissociation as a means of alleviating pain. Several (though not all) laboratory studies conducted mostly on individuals who were not running have in fact shown that dissociation relates to increased pain tolerance during endurance tasks (Gill & Strom, 1985; Johnson & Siegel, 1992; Morgan et al., 1983; Rejeski & Kenney, 1987; Russell & Weeks, 1994; Weinberg, 1985; Weinberg et al., 1984). Since dissociation presumably involves blocking out important pain sensations, some authors (Morgan & Pollock, 1977; Sachs, 1984; Schomer, 1987) believe that dissociation may be risky to runners and could increase the chance of injury due to the tendency to ignore physiological warnings sent by the body. For example, Morgan and Pollock cited a runner who experienced fractures of both the left and right fibula, and stated, “In all likelihood these injuries could have been prevented had the runner not attempted to dissociate the painful input” (p. 401).

Masters and Lambert (1989), however, pointed out that a careful reading of the reports filed by Morgan and Pollock indicate that runners were well aware of the pain (i.e., they had associated to it) but chose to continue running. They argued that choosing a cognitive strategy has little to do with pain relief and more to do with motivation. Supporting this are the findings that runners prefer association in races but dissociation in training. They proposed that this is incongruent with the idea that dissociation relieves pain. Runners in races are likely performing at near maximal level and are thus more likely in pain than those in training. Thus, based on the original theory, racers should be dissociating more, yet the opposite is found. In their study, Masters and Lambert supported the idea that motivation rather than pain influences cognitive strategy. In particular, they found that among marathon runners, tendency toward association was related to being more competitive.

An alternative explanation, offered by McCaul and Malott (1984), is that distraction (dissociation) is only effective for reducing distress when stimulation is mild (rather than intense). Correspondingly, they hypothesized that for higher discomfort levels, redefinitional (association) strategies would be better. Redefinitional strategies require individuals to attend to the pain but interpret it in benign or nonemotional ways. Authors contended that at lower intensity levels, distraction
can fill attentional space and prevent or reduce conscious sensation of pain. However, at higher levels, pain reaches a degree of saliency that results in an inevitable invasion of awareness. At these levels, distraction does not work, but attending to the stimulus and redefining it may result in reduced negative emotional arousal, thus reducing the overall discomfort level.

This hypothesis has not been thoroughly tested, and existing results are mixed (e.g., Brewer & Karoly, 1989; McCaul, Monson, & Maki, 1992; Stevens, 1991-1992). Further, research has been conducted mostly on participants exposed to very brief, experimentally induced pain (e.g., cold pressor test). Nevertheless, this theory provides an intriguing perspective on the cognitive strategies used by distance runners, perhaps accounting for why association has been linked to injury (see below). Essentially, runners may associate (in a redefinitional manner) in part as a coping method, which may allow them to interpret their pain as sensory input that is void of strong emotional overlay (see Laasch, 1994-1995) and is therefore less aversive. They can thus continue running through painful stimulation, but the chance of injury may be increased.

Apart from the anecdotal reports mentioned above, relatively little research data exists about whether A/D actually increases risk of injury. Masters and Lambert (1989) found that dissociation scores in the marathon and training were not related with a history of running-related injury. Further, information obtained from four marathon runners who dropped out of the race due to injury showed them to be associating in the miles prior to injury and at the time the injury was reported. Ungerleider et al. (1989) also found that association scores were higher for masters runners who had a history of injury than for those who had not been injured. Schomer (1986) reported that runners in his study managed pain by associating or slowing down, not dissociating. Silva and Appelbaum (1989), on the other hand, reported that elite runners dissociated during the later stages of a marathon in response to pain. However, these researchers provided no evidence of injury to any of the runners and generally characterized the runners’ cognitive strategies as flexible and adaptive.

Masters and Ogles (1992, 1996) specifically addressed the relations between A/D and injury in two studies. In their retrospective report, they found no relation between dissociation in training or in a marathon with total number of running-related injuries in the past year. Similarly, dissociation scores for those with no previous running injuries did not differ from those having sustained at least one injury. The researchers did find reports of injury related to a cluster of variables showing that injured runners ran more races and were more competitive. The prospective study was interesting because it found that association scores on the AFQ (Brewer, Van Raalte, & Linder, 1996) significantly differentiated between injured and noninjured runners 4 months later. Injured runners had higher association scores. This finding was further tested with analyses that controlled for running addiction, competitive and goal-oriented motivation, history of injury, miles and days of running per week, and number of races and marathons. Even after these potentially important variables were controlled, association still predicted injury. Once again, dissociation did not relate to injury. The authors also found dissociation scores related to slower race times, fewer training miles, and lower competition and goal attainment motivation, suggesting that dissociating runners are not as heavily invested in running and run more slowly.
Since findings pertaining to injury are important, this area could certainly benefit from additional studies. Current findings suggest that some runners may use dissociation to block pain leading to injury. However, the typical use of dissociation, at least among marathon runners, appears to be safe and unrelated to injury. One study does link association with injury. The potentially important role of motivations as cognitive strategy determinants and injury predictors should be considered and investigated further.

Conclusions and Recommendations

Several conclusions and recommendations evolve from this review of the A/D literature from the past 20 years. First, A/D has become a fruitful area of research, particularly when the relative newness of sport psychology as a field is considered. This line of inquiry has led to a substantial body of literature that has been productive for nearly 2 decades.

We believe that continued use of the term dissociation to describe cognitive processes of distraction or external focus among runners will continue to create confusion. Although similarities exist between dissociation in running and dissociation as a clinical phenomenon, there are notable phenomenological differences and there is no evidence that dissociating runners experience higher rates of dissociative symptoms or disorders. As these disorders become better known among the general public, the confusion will likely grow. We suggest that future writers acknowledge the historic foundations but change the name they ascribe to this type of cognitive activity to something less pathologically burdened. Although each has shortcomings, terms such as cognitive strategies, attentional focus (external or internal), or distraction are appropriate.

A/D measurement will probably remain a difficult area for future investigators. All measurement methods have inherent strengths and limitations, and measurement issues generally affect results. Thus, we suggest that investigators pursue systematic lines of research utilizing multiple measurement technologies. Others may wish to conduct specific studies where measurement method serves as the independent variable. In any case, much more attention needs to be focused on measurement issues. At present, we have very little information regarding how A/D measures may influence research conclusions, though there is good reason to suspect that they do.

Various research designs have been applied to A/D. We support continued diversity of designs but are particularly enthusiastic about two types of studies. First, we encourage more experimental studies using running as part of the procedure. Some of these studies may use A/D as independent variables to assess the effects on various types of running situations. For example, although the idea that dissociation enhances endurance is quite appealing, experimental support for this among those actually engaged in running is scant. As another example, longer term (or longitudinal) controlled experimental studies, where participants are carefully trained to use association or dissociation for a lengthy time period, could facilitate learning more about injuries, performance, and other variables. The use of simple instructional sets is discouraged because they cannot induce the proper cognitive set, thus rendering results difficult to interpret. Further, manipulation checks are essential in any study using A/D as an independent variable. Sophisticated designs also assess for differential expectancy or demand created by A/D.
Cognitive Strategies

manipulations. In this manner, by using manipulation checks and assessing for extraneous cognitive variables, the internal integrity of designs can be measured and maintained.

A/D may also be utilized as a dependent variable in experimental designs used to investigate the effect of other important variables on A/D use. For example, randomly assigning runners into experimental groups with varying levels of competitive demands (independent variable) followed by measuring differences in the resulting use of cognitive strategies may help to determine how degree of competition affects the choice and utilization of cognitive strategies. Given previous findings, we would predict that the higher the competition, the more association would be used. Competition is only one of many motivational variables that should be studied in experimental designs to determine how they influence A/D. This type of study would allow for greater experimental control and would add to our theoretical understanding of the factors that influence A/D utilization.

Similarly, we further encourage using naturalistic and observational designs but only within the context of theory. Investigators using observational approaches cannot justify conducting studies to simply describe general A/D use. That work has been done, and research has progressed beyond this development stage. However, observational or correlational studies aimed at addressing specific questions have much to offer. This is true for all areas of A/D research, including pain, injury, performance, and relations with potentially important variables, such as motivations and other cognitive activities (e.g., hypnosis).

We specifically encourage A/D investigations in certain subject areas. Because of its potential importance, injury would be at the top of the list. A/D as it relates to psychological and emotional effects of exercise is also an important topic. For example, reporting on the findings from their naturalistic study, Masters and Lambert (1989) suggested that dissociation may have mood-reinforcing properties. Fillingim and Fine (1986) reported similar results for external focus (dissociation) in a controlled laboratory setting. Other significant topics that have not received adequate attention include A/D effects on exercise adherence and A/D use for specific populations, such as the young or elderly.

The theoretical foundations of A/D need further development. The field presently operates on somewhat implicit and unexamined theoretical underpinnings. Since Morgan and Pollock's (1977) initial study, little has been done to directly advance our theoretical understanding of why, when, how, in what context, and for whom A/D operates. Studies that offer theoretical proposals and then test them empirically are encouraged, as are “thought pieces” that offer fresh insights into the cognitive strategies of runners and other exercisers. Because cognitions clearly play a large role in all areas of sport performance, we must pursue studying these cognitions within reasoned frameworks.

Several practical- and performance-related findings pertaining to A/D are worth noting. First, use of association is generally correlated with faster running performances, whereas the opposite is true for dissociation. Further, racers prefer association, and runners in training prefer dissociation, though all use both. This suggests that runners and coaches concerned about speed should use and teach associative strategies. Dissociation is inversely related to physiological awareness and ratings of perceived exertion in laboratory studies, but no clear findings are available regarding how it relates to endurance among runners. Nevertheless, our belief is that runners capable of dissociation are better able to endure longer distance
training because they can, at a minimum, reduce the mental monotony and fatigue that accompany the physical aspects of these workouts. Similarly, dissociation does not appear to increase the risk of injury, though it may offer emotional and psychological benefits. Association, on the other hand, may allow runners to continue performing despite painful sensory input and may lead to increased risk of injury. This also argues for using dissociation as a training technique, leading to improved adherence by increasing the self-reinforcing properties of the run or workout without sacrificing safety.

References


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