**ANALYZING ALERTNESS AMONG PEOPLE WITH PROFOUND
MULTIPLE DISABILITIES: IMPLICATIONS FOR
PROVISION OF TRAINING**

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We investigated whether variations in alertness among individuals with profound multiple disabilities affected subsequent responsiveness to training programs. Three experiments were conducted involving 5 people. In Experiment 1, results indicated that alertness of 3 individuals increased with provision of skill-acquisition training programs. Results also indicated no predictive relationship between alertness levels prior to training and subsequent responsiveness to training. Experiment 2 replicated results of Experiment 1 with 2 participants from Experiment 1 and an additional participant. Results of Experiment 2 also indicated that the increased alertness levels accompanying provision of training were not a function of the participants simply being in an inactive environment prior to training. Results of Experiment 3 indicated that alertness of an additional participant increased through provision of another training intervention, involving a systematic preference assessment. Responses during the preference assessment appeared to be unrelated to previously existing alertness levels. These findings suggest the need for caution when considering the withholding of scheduled training because an individual appears to be nonalert.

DESCRIPTORS: alertness, assessment, profound multiple handicaps, training

An area of growing concern in developmental disabilities is the provision of effective habilitative services for people with profound multiple disabilities. It is becoming increasingly apparent that it can be very difficult to teach functional skills to this population (Thompson & Guess, 1989). However, despite the difficulty in teaching people with profound multiple disabilities, these individuals warrant effective habilitation for legal (Dussault, 1989), governmental regulatory (Reid, Phillips, & Green, 1991), and humanitarian (Evans & Scotti, 1989) reasons.

Research with people with profound multiple disabilities is beginning to occur in more diverse areas than has occurred traditionally. One such area involves the study of alertness levels (e.g., Bourgeois, Hawkins, & Brady, 1990; Guess et al., 1988;

Guess, Roberts, et al., 1990; Guess, Siegel-Causey, et al., 1990). Attention has been directed to this area in large part because of the frequent lack of alertness, as well as changes in alertness, that are observed with many individuals with profound multiple disabilities when habilitative services are being provided (Haskett & Hollar, 1978; Simeonson, Huntington, & Parse, 1980).

Varied alertness levels are of particular concern for skill-acquisition training. Our experience suggests that trainers frequently withhold training when students appear to be nonalert, based on the premise that students will respond to training only when they are alert. Such a practice coincides with the view that changes in alertness may reflect alterations in biobehavioral states similar to those reported among nondisabled infants (Guess et al., 1988), and certain states may prevent an individual from responding to environmental stimuli (Rainforth, 1982). However, the relation between alertness levels and possible biobehavioral states remains unclear (Guess, Siegel-Causey, et al., 1990; Rainforth, 1982), and little objective information is available for determining whether it is beneficial to withhold training when students appear to be nonalert.

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The purpose of this investigation was to assess the relation between observable alertness levels among people with profound multiple disabilities and their subsequent responsiveness to training programs. The principal research question was whether or not training should be withheld due to lack of student alertness.

GENERAL METHOD

Social Validation of the Research Question

Withholding training due to lack of student alertness is a practice we have observed clinically. To socially validate our observation, a survey was administered to 53 educators in two agencies in two states that serve people with multiple disabilities, and to 32 practitioners (e.g., educators, occupational therapists) from three other states who were attending a professional workshop. The survey asked the following questions: Do your students show varying alertness? Is it more helpful to conduct training when students are alert versus nonalert? Is training ever postponed due to student nonalertness? Results indicated that 98% of the trainers served students with varying alertness, 98% reported that it was more helpful to conduct training when students were alert versus nonalert, and 69% postponed training due to nonalertness. These results suggest the importance of determining whether training should be withheld due to nonalertness given that withholding training seems to be a common practice.

Participants and Setting

Five women, aged 22 to 29 years, who resided in a residential facility participated in the study. Each participant was nonambulatory and had profound mental retardation as well as profound physical disabilities such as spastic quadriplegia. Each participant had a seizure disorder, with seizure frequency varying from daily to monthly. Four participants had visual impairments, and 1 had a hearing impairment. The participants exhibited no conventional communicative skills and were completely dependent on staff for meeting basic needs.

Three individuals (Joy, Mary, and Mada) participated in Experiment 1, 3 (Joy, Mada, and Missy) participated in Experiment 2, and 1 (Julie) participated in Experiment 3.

Medications administered to the participants on a consistent basis included anticonvulsants, vitamins, and stool softeners. Medications that changed during the investigation were the discontinuation of an ulcer-treatment medication for Missy in Experiment 2 and an increase in dosage of an antibiotic for Julie in Experiment 3. The medication changes were not viewed as confounding events because of the experimental designs employed (alternating treatments and multielement) and because the changes occurred toward the end of the experiments.

These people were selected for three reasons. First, the severity of their disabilities was characteristic of the most profound disabilities (Landesman-Dwyer & Sackett, 1978). Second, staff reports and records indicated that each participant frequently had failed to make progress on skill-acquisition programs. Third, staff reports and observations indicated that the participants displayed varying alertness levels.

All procedures were conducted in adult education classrooms that the participants attended on weekdays. Each classroom typically included six students and two education staff members.

Behavior Definitions and Observation Systems

Alertness definitions (Table 1) were derived from Guess, Roberts, et al. (1990) and Landesman-Dwyer and Sackett (1978). Alertness categories included asleep, drowsy, and awake. Awake consisted of five subcategories: nonalert/nonactive, alert/nonactive, alert/active, agitated, and alert/active/nonpurposeful. However, because the latter two subcategories were observed during less than 1% of observation intervals, they are not included in data analysis. Categories and subcategories were differentiated by three sets of behaviors: position and/or movement of the eyes, gross body movement, and vocalizations. The categories and subcategories can be conceptualized on a continuum

Table 1
Alertness Continuum and Definitions of Alertness Categories and Subcategories

Alertness continuum	Category	Subcategory	Definition
1 (least alert)	asleep		eyes closed; no apparently purposeful body movement; no vocalizations except those characteristic of sleep (e.g., snoring)
2	drowsy		eyes partially and/or intermittently closed; apparently purposeful body movement may be present, but if so the movement is slower than usual for the individual (stereotypy may also be present); vocalizations may be present, but if so are intermittent, infrequent, and brief
3	awake	nonalert/nonactive	any of the subcategory criteria are met eyes open with no apparent eye contact with external stimuli or tracking of moving stimuli; no apparently purposeful body movement; no vocalizations except possible stereotypic sounds
4		alert/nonactive	same as nonalert/nonactive except there is apparent contact with external stimuli or eye tracking
5 (most alert)		alert/active	eyes open with apparent eye contact with external stimuli or eye tracking; apparently purposeful body movement present; vocalizations may be present (except for crying or screaming)

Note. Purposeful body movement had to involve movement without simultaneous physical guidance by a trainer (i.e., although movement following the removal of a trainer's physical guidance was considered purposeful body movement, any movement during the application of the trainer's physical guidance was not considered purposeful body movement).

of alertness ranging from 1, least alert (asleep), to 5, most alert (awake/alert/active).

One participant was observed at a time, using an alternating 10-s observe, 5-s record procedure. During the record interval, the category and/or subcategory judged to have occurred during most of the observation interval was recorded (Guess, Siegel-Causey, et al., 1990). Reliability was assessed interval by interval, by dividing the number of agreements by agreements plus disagreements and multiplying by 100%. Definitions and observations for program responsiveness were individualized for each training program.

EXPERIMENT 1

Method

Behavior definitions and observations. Observations of alertness were conducted for 3 min before, 3 min during, and 3 min after each training session. Interobserver agreement checks occurred on 33 occasions (13% of observations) involving all participants and experimental conditions. Overall, occurrence and nonoccurrence agreement percent-

ages each averaged at least 91% for each alertness category. Overall agreement averaged at least 97% for each subcategory, and nonoccurrence averaged at least 88%. Occurrence agreement was more variable, averaging 88% for nonalert/nonactive, 78% for alert/nonactive, and 76% for alert/active (range, 0% to 100% for each subcategory). The lower values were due to low frequencies of occurrence. There were no disagreements between observers on the occurrence of each subcategory during at least 97% of all 10-s observation intervals.

For Joy and Mary, program responsiveness was defined as degree of independence in performing a target skill, reflected by the type of prompt required to evoke their performance (Green, Reid, Canipe, & Gardner, 1991). Prompt levels were recorded on a 4- or 5-point scale, with 1 representing the least independence (full physical guidance) and 4 or 5 representing the most independence (no physical prompt). Mada's responsiveness measure consisted of correct responses to program trials. Reliability observations were conducted during at least 29% of all sessions for each participant. Occurrence agreement on prompt level and correct response averaged at least 99% for each participant.

Experimental procedures. Baseline observations occurred when the most alert subcategories (Levels 4 and 5: alert/nonactive and alert/active) were likely to be infrequent (based on teacher reports). These periods typically were characterized by a lack of ongoing activity, with participants sitting in their wheelchairs with no apparent interaction with staff or materials.

All training sessions were conducted individually by a staff trainer. All performance consequences had been previously assessed to be probable reinforcers (Green *et al.*, 1988). The target behavior in Joy's training program was cutting paper with an adapted paper cutter. If Joy performed the task following a verbal request by pushing the handle down, a taste of pudding was provided. If Joy did not comply within 5 s, a graduated prompting sequence was implemented based on locus of physical contact of the prompt (O'Brien, Bugle, & Azrin, 1972). The trainer began the sequence by pairing the request with a physical touch at Joy's elbow. If she again failed to comply, the trainer paired the instruction with increased physical assistance by partially guiding her at the wrist and then, if needed, hand-over-hand physical guidance. Following use of pudding as a reinforcer (Program 1), a flickering light was used as a consequence (Program 2).

Mary's target behavior was touching an object on cue. The training format, number of trials, and prompt sequence were identical to Joy's program. However, in accordance with Mary's habilitation plan, a primary goal was to identify a reinforcing stimulus. Hence, her program involved evaluating the reinforcing effects of a previously identified preferred stimulus (juice) by first conducting the program without juice (Program 1) and then with juice provided contingently (Program 2).

Mada's target behavior was cutting paper using adaptive equipment. The trainer verbally prompted Mada to cut the paper after placing her hand on the handle of the paper cutter. If Mada pushed the handle down (correct response), praise was provided. If Mada did not comply, the trainer physically guided her through the task, and then initiated another trial in the same manner. Each session included 10 trials.

Experimental design. A multielement design was used with each participant. Experimental sessions consisted of a baseline session followed by a training session and then another baseline session. In addition, a baseline condition preceded the multielement presentation of baseline and training sessions for Joy.

Results and Discussion

Effects of training on alertness levels. Occurrence of alertness categories varied across and within participants (Table 2). For Joy and Mada, who displayed the two most nonalert categories prior to training sessions, these categories decreased to 0% of observation intervals or near 0% during training. Conversely, the most alert category increased during training. During baseline sessions immediately after training, Levels 1 and 2 (asleep and drowsy) remained below baseline levels and Level 5 (awake) remained above the preceding baseline levels. Mary displayed frequent occurrences of Level 5 (average of 97% across all intervals) regardless of experimental condition.

Results for the most alert behavior (Level 5) are presented in Figure 1. Results for baseline sessions after training, which were identical to those before training (for an exception, see Mada's results below), are not presented in the figure. For all participants, alert/active behavior was infrequent during baseline sessions before training, with subsequent increases during training. Joy's alert/active behavior averaged 0% before training, 16% (range, 0% to 75%) during the first training program (although there was a decrease during the latter training sessions), and 67% (range, 0% to 100%) during the second program. Mary's alert/active behavior averaged less than 1% (range, 0% to 8%) before training, 42% (range, 0% to 92%) during the first training condition (decreasing trend), and 31% (range, 0% to 75%) during the second training condition (increasing trend). Mada's alert/active behavior averaged 14% (range, 0% to 100%) before training and 93% (range, 25% to 100%) during training. For the return-to-baseline sessions, Mada's alert/active behavior ($M = 35\%$, range, 0% to 100%) was somewhat above the before-

Table 2
Average Occurrence (Percentage of Intervals) of Major Alertness Categories per Experimental Condition for Each Participant

Subject	Alertness category	Experimental condition						
		Training Program 1			Training Program 2			
Joy		Baseline	Baseline (before)	During	Baseline (after)	Baseline (before)	During	Baseline (after)
	asleep	22	51	0	0	49	0	0
	drowsy	68	15	1	21	26	0	6
	awake	10	34	99	79	25	100	95
Mary		Baseline training			Training with consequence			
		Baseline (before)	During	Baseline (after)	Baseline (before)	During	Baseline (after)	
	asleep	0	0	0	1	0	0	
	drowsy	0	0	12	5	0	1	
	awake	100	100	88	94	100	99	
		Training program						
Mada		Baseline (before)	During	Baseline (after)				
	asleep	1	0	0				
	drowsy	18	1	12				
	awake	81	99	87				

training level, although it was well below the level exhibited during training.

Relation between alertness prior to training and subsequent responsiveness to training. Spearman rank correlation coefficients were derived between percentage of observation intervals involving specific levels of alertness per session before training and responsiveness (average prompt level or percentage correct responses) per session during training. Correlational analyses were not conducted for the most alert behavior (Level 5), because there was minimal alert/active behavior before training ($M = 5\%$ across participants). However, because nonalert/nonactive averaged at least 25% before training for all individuals, correlational analyses were conducted between nonalert/nonactive and program responsiveness. We hypothesized that a negative correlation would exist between increases in nonalert/nonactive (i.e., decreases in alertness) before training and increases in training responsiveness (vs. the null hypothesis of zero correlation). Because alert/nonactive occurred before training for

Mary (67%) and Mada (40%) but occurred only minimally for Joy (5%), correlational analyses were conducted between alert/nonactive before training and program responsiveness for Mary and Mada. We hypothesized that as alert/nonactive increased, program responsiveness would increase, because (a) if an individual was alert, she would be more responsive to immediately forthcoming training, and (b) an individual might be alert but not active due to a lack of environmental activity to which she could respond. The analyses indicated no statistically significant correlations between nonalert/nonactive and program responsiveness, with r values of $-.06$ ($p > .10$), $.37$ ($p > .05$), and $.10$ ($p > .10$) for Joy, Mary, and Mada, respectively. Although the correlation for Mary approached significance, it was in the direction opposite to that hypothesized. There were also no significant correlations between alert/nonactive and program responsiveness, with r values of $-.34$ ($p > .05$) and $.11$ ($p > .10$) for Mary and Mada, respectively. Again, the correlation that approached significance

Figure 1. Percentage of observation intervals with alert/active behavior for each participant for each baseline (before) and training session for each experimental condition.

(for Mary) was in the direction opposite to that hypothesized.

In addition to lack of across-session correlations, the participants' overall progress on the training programs appeared to be unrelated to alertness level before training. For example, whereas Joy exhibited the most nonalert behavior before training (Table 2), she appeared to make as much or more progress in her training as did Mary and Mada. Throughout her program, Joy's prompt level averaged 2 (range, 1 to 3). At the beginning of her program, her average for the first five sessions was 1.8, whereas for the last five sessions her average increased to 2.8. Mary's average prompt level was 1.6 (range, 1.0 to 3.2), increasing from an average of 1.4 during the first five sessions to 2.1 during the last five sessions. Mada showed no progress, with an overall average of 77% (range, 10% to 100%) correct responses, and an average of 68% correct during the first five sessions and 70% correct during the last five sessions. The progress exhibited by Joy and Mary during their training programs was not accompanied by any apparent changes in alertness before the training sessions over the course of the programs (see Figure 1).

Results of Experiment 1 do not support a relation between alertness before training and subsequent responsiveness to training. Further, provision of training actually enhanced alertness by increasing occurrence of the most alert behavior (Level 5) and decreasing less alert behavior. A practical implication of these results is that training sessions should not necessarily be withheld because an individual appears to be nonalert. However, one limitation of Experiment 1 makes such an implication somewhat premature. Specifically, in one sense, increases in alertness as a function of implementation of a training program are not surprising, given that participants were not exposed to environmental activity immediately before training. Common sense suggests that people are more alert in an active environment (i.e., during a training program) than in an inactive environment (see also Belfiore, Browder, & Mace, 1993). Perhaps if a more active environment exists and an individual is nonalert, implementation of a training program will enhance alert-

ness less relative to the effects of training immediately following an inactive environment. Relatedly, withholding training may be appropriate if an individual does not appear to be alert in an active environment, because alertness may not increase during training.

EXPERIMENT 2

Experiment 2 evaluated the effects of alertness in prior active environments compared to prior inactive environments on training responsiveness.

Method

Behavior definitions and observation systems. Alertness was observed as in Experiment 1 with the exception that to minimize possible observer bias, each day a different observer recorded alertness during each successive experimental session for each participant. Interobserver checks involved all participants and conditions, although they occurred during only a small sample (8%) of all sessions. Overall interobserver agreement averaged at least 96% for each category and subcategory. Nonoccurrence agreement averaged at least 85%, except for the awake category ($M = 69\%$; range, 0% to 100%). Occurrence agreement was more variable, averaging 67% for asleep, 70% for drowsy, 92% for awake, 57% for nonalert/nonactive, 71% for alert/nonactive, and 30% for alert/active (range, 33% to 100% for awake and 0% to 100% for all other categories). The lower values were due to low frequencies during reliability checks. There were no disagreements on the occurrence of each category and subcategory during at least 96% of all observation intervals.

Program responsiveness was defined as in Experiment 1. Interobserver agreement checks occurred during one training session for Joy and five for Missy, with 100% agreement on prompt level. Interobserver agreement was assessed during five sessions with Mada regarding number of pieces of paper cut. Using the formula of smaller number of pieces cut recorded by one observer divided by the larger number recorded by the second observer and multiplied by 100%, reliability averaged 99% (range, 98% to 100%).

Table 3

Average Occurrence (Percentage of Intervals) of Alertness Categories and Subcategories per Experimental Condition for Each Participant

Participant	Category	Subcategory	Experimental conditions		
			Baseline	Active/ nontraining	Training
Joy	asleep		50	31	0
	drowsy		24	18	12
	awake		26	51	88
		nonalert/nonactive	15	23	1
		alert/nonactive	11	18	30
		alert/active	0	10	56
Mada	asleep		19	1	7
	drowsy		23	8	10
	awake		58	91	83
		nonalert/nonactive	9	0	3
		alert/nonactive	41	13	15
		alert/active	7	78	61
Missy	asleep		2	0	0
	drowsy		23	0	0
	awake		75	100	100
		nonalert/nonactive	22	6	0
		alert/nonactive	52	87	68
		alert/active	0	7	28

Experimental conditions. Baseline was conducted as in Experiment 1. In active/nontraining sessions, attempts were made to provide a stimulating environment yet not provide formal training using prompts or physical guidance. Individually preferred activities were provided based on preference assessments and/or staff reports of favorite activities. Each active/nontraining session was conducted individually by one staff person for 5 min. Joy's activity involved continuous presentation of a flickering light and verbal interaction from a staff person, along with praise contingent on Joy looking at the light. For Mada, a magazine with pictures was provided and the staff person talked to Mada and provided praise when Mada turned a page. Missy's activity involved verbal interaction, presentation of a lighted make-up mirror, praise contingent on looking at the mirror, and putting make-up on her face. Training sessions were conducted as in Experiment 1 except that (a) Joy's program focused on teaching her to grasp the handle of the paper cutter, (b) Mada's dependent measure was the number of pieces of paper cut and, (c) Mada's

consequence was a choice of edible items. Missy's program involved activating an adapted switch, with the training format similar to that for Joy.

Experimental design. In a multielement design, baseline sessions were followed on alternating days by either an active/nontraining session and then by a training session, or by a training session without a preceding active/nontraining session.

Results and Discussion

Effects of training on alertness levels. Results for alertness categories during training relative to baseline sessions were similar to those of Experiment 1 (Table 3). For the 2 participants who exhibited infrequent awake behavior during baseline (Joy, 26%; Mada, 58%), there were large increases in awake behavior during the training sessions, with respective averages of 88% and 83%. Missy was awake more frequently (75%) during baseline sessions, but nevertheless displayed an increase (100%) during training. There were also increases in awake behavior during the active/nontraining sessions relative to baseline for each participant (Table 3).

Results for Level 5 were also similar to those of Experiment 1 (see Figure 2), in that participants displayed more alert/active behavior during training than during baseline (see Table 3 for averages). Increases in alert/active behavior relative to baseline occurred regardless of whether training was preceded by active/nontraining sessions (alert/active behavior during training preceded by active/nontraining averaged 58%, 66%, and 32% respectively, for Joy, Mada, and Missy, whereas their respective averages during training not preceded by active/nontraining were 54%, 52%, and 23%). Randomization tests (Siegel, 1956) conducted at the .05 level of significance indicated that the differences between alert/active behavior for training preceded and not preceded by active/nontraining were not significant for any participant. As indicated in Table 3 and Figure 2, implementation of training was also accompanied by increases in alert/active behavior relative to the preceding active/nontraining sessions for Joy and Missy. Mada's alert/active behavior was high during active/nontraining sessions and remained relatively high during training sessions.

Relation between alertness level prior to training and responsiveness to training. Correlational analyses were conducted as in Experiment 1, using the alertness levels of all baseline sessions. Correlational analyses for active/nontraining sessions were not conducted because of the small number of sessions (eight) per participant. Correlations were obtained between nonalert/nonactive behavior before training and program responsiveness for all participants and between alert/nonactive behavior and responsiveness for Mada and Missy (but not for Joy, who exhibited alert/nonactive behavior during only 4 of 16 baseline sessions). There were no significant correlations for nonalert/nonactive behavior, with r values of .19 ($p > .10$), .03 ($p > .10$), and .31 ($p > .10$) for Mada, Missy, and Joy, respectively; or for alert/nonactive behavior, with r values of .39 ($p > .10$) and $-.05$ ($p > .10$) for Mada and Missy, respectively.

In contrast to Experiment 1, Joy did not show progress during training, perhaps due to lack of a sufficient number of training sessions (16, in con-

trast to 29 in Experiment 1). Joy's prompt level averaged 2.3 (range, 1.4 to 3.0), with no difference in the average for the first five sessions (2.0) and last five sessions (2.1). Mada's and Missy's training performances were variable, averaging 35 pieces cut (range, 0 to 73) and a 1.8 (range, 1.0 to 2.3) prompt level, respectively, with no apparent increase from the first five (respective averages of 53 and 1.8) to the last five training sessions (31 and 1.9). As indicated by the correlational analyses, the variability that occurred across training sessions was not related to alertness level prior to the training sessions.

Results of Experiment 2 are consistent with those of Experiment 1, in that alertness levels before training were not predictive of responsiveness to the training. Also, provision of training increased alertness, whether participants were in an active or inactive environment before training. During training, the most alert behavior increased for all participants relative to an inactive environment (baseline) and relative to an active (nontraining) environment for the 2 participants who displayed lower alert/active levels in the latter environment. These results further suggest that training should not necessarily be withheld due to perceived non-alertness, even in an environment that appears to be stimulating.

EXPERIMENT 3

Experiment 3 continued the analysis of the relation between alertness and responsiveness to training by involving another individual and a different measure of responsiveness. The measure was response to a preference assessment (Green et al., 1991; Pace, Ivancic, Edwards, Iwata, & Page, 1985).

Method

Behavior definitions and observation systems. Reliability observations on alertness were conducted during nine (14%) sessions, including each experimental condition. For each alertness category, overall, occurrence, and nonoccurrence reliabilities were

Figure 2. Percentage of observation intervals with alert/active behavior for each participant for each baseline (before) session, active/nontraining session, and training session.

100%. For each awake subcategory, reliabilities averaged at least 97% for overall and 90% for nonoccurrence. Occurrence reliability was more variable, averaging 100% for nonalert/nonactive, 94% (range, 86% to 100%) for alert/nonactive, and 83% (range, 67% to 100%) for alert/active. The target behavior during the preference assessment was an approach response to a stimulus presentation, defined as making an apparent voluntary body movement toward the stimulus, maintaining contact with the stimulus for at least 3 s, and/or exhibiting a positive vocalization within 5 s of the stimulus presentation (Green et al., 1988). Reliability checks were conducted for five trials for each stimulus, with occurrence agreement of 100%.

Preference assessment and experimental design. Approach behaviors were assessed with three stimuli: music, pudding, and juice. Sessions were conducted as in Green et al. (1988), with five trials per stimulus per session. Alertness observations occurred for the first 3 min of each assessment. A multielement experimental design was used, with experimental sessions consisting of baseline (Experiment 1) followed by a preference assessment and then a return to baseline.

Results and Discussion

Julie was awake during the vast majority of observation intervals before ($M = 83\%$), during ($M = 93\%$), and after ($M = 99\%$) preference assessment sessions. Effects of the preference assessment on occurrences of the two most nonalert categories (Levels 1 and 2, asleep and drowsy) were evaluated using the five baseline sessions during which these behaviors occurred (with asleep plus drowsy averaging 67%, 100%, 50%, 100%, and 8% of these baseline sessions). During the preference assessments immediately following these five baseline sessions, asleep plus drowsy decreased to averages of 0%, 8%, 0%, 58%, and 0%, with corresponding increases in awake behavior.

As indicated in Figure 3, Level 5 behavior was more frequent during preference assessment sessions ($M = 37\%$; range, 0% to 75%) than during the preceding baseline sessions ($M = 1\%$; range, 0% to 8%). Alert/active behavior during the return to

Figure 3. Percentage of observation intervals with alert/active behavior for Julie for each baseline (before) and preference assessment session.

baseline was essentially the same as during the first baseline condition ($M = 2\%$; range, 0% to 25%).

To evaluate whether Julie's approach behavior differed when she was asleep or drowsy before preference assessments compared to when she was awake, her approach behavior was compared between baseline sessions when she was awake 100% of the observation intervals (representing 76% of the sessions) and when she exhibited asleep or drowsy behavior (awake averaged 35%). Julie's approach behavior did not differ when she was awake all of the time compared to when she was asleep or drowsy much of the time before an assessment; she approached pudding at a level representing a strong preference (Green et al., 1988, 1991; Pace et al., 1985) in both situations (99% and 96%, respectively). The respective percentages were 11% and 0% for juice and 21% and 48% for music.

There was no relation between the awake subcategories before the preference assessment and performance during the assessment. The only awake subcategory that occurred frequently before the assessment was alert/nonactive ($M = 80\%$; range, 0% to 100%; all other awake subcategories averaged 3% or less). There were no differences in approach responses during the assessment when alert/nonactive behavior was frequent or infrequent before assessment sessions.

Results of Experiment 3 are consistent with those

of Experiments 1 and 2, in that alertness levels before a training intervention did not appear to be related to responsiveness to the intervention. The stimulus identified as strongly preferred was the same whether Julie was nonalert or alert before the assessment.

GENERAL DISCUSSION

Results of the three experiments do not support the practice of withholding training because people with profound multiple disabilities appear to be nonalert when training is scheduled to occur. Rather, these findings suggest that alertness actually can be increased by the provision of training, and in some cases by an active nontraining environment (cf. Belfiore *et al.*, 1993). Relatedly, existing levels of alertness do not appear to be indicative of how individuals will respond during training. In light of these results, and in conjunction with the survey responses indicating frequent withholding of training due to perceived nonalertness, practitioners should be urged to be more cautious when deciding to withhold training. A more appropriate strategy would be to follow a data-based decision process in which training is initially conducted regardless of alertness, and alertness and program responsiveness are monitored. If this monitoring indicates that an individual's behavior during training is related to specific measures of nonalertness before training, then a decision to withhold training when the person exhibits those indices seems to be appropriate.

This recommendation for determining if and when to withhold training should be considered carefully. In particular, it pertains only to people with profound multiple disabilities and to alertness as described here. Generalizations should not be made to other behavioral indices of responsiveness to environmental activity among other populations such as, for example, general attending behavior (Kazdin, 1977) and orienting behavior (Hardiman, Goetz, Reuter, & LeBlanc, 1975) among people with less severe disabilities. Also, even with people with profound multiple disabilities, considerably more research is needed to better understand the importance of changes in alertness. In this regard,

the basis upon which many trainers have decided to withhold training due to perceived nonalertness warrants investigation. It remains unclear whether the practice of withholding instruction is due to inaccurate assumptions or to actual performance of some individuals during training. One possible explanation for the discrepancy between our experimental results and the survey results is that more extreme alertness levels were observed by practitioners relative to the levels observed during our experiments. More specifically, the most extreme level of nonalertness (asleep) was not observed frequently in this investigation. It may be that individuals who exhibit more frequent sleep before training will demonstrate differential responsiveness during training based on the presence or absence of sleep. Additional research is warranted to delineate more precisely the possible relation between extreme nonalertness and subsequent program responsiveness. However, until such research is conducted, decisions to withhold training due solely to observed nonalertness seem to be unwarranted.

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