

Mindful staff increase learning and reduce aggression in adults with developmental disabilities

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Abstract

Aggression by individuals with developmental disabilities may threaten their community placement. In a multiple baseline design across group homes, we provided group home staff with behavioral training and later with mindfulness training to assess the impact on aggressive behaviors and the number of learning objectives mastered by individuals in their care. We also assessed other outcomes including activities engaged in by the individuals, use of restraint by staff, and measures of satisfaction. The effect of varying staff-resident ratios was evaluated on all measures. When compared to baseline, the number of staff interventions for aggression showed some reduction following behavioral training, but decreased substantially only following mindfulness training. There was also some increase in the number of learning objectives mastered by the individuals following behavioral training, but greater and more consistent increases were obtained only after mindfulness training. Improvements also occurred on the other measures assessed after behavioral training, but these were always greater and more consistent following mindfulness training. In addition, consistent gains followed behavioral training only with a high staff-resident ratio whereas the larger gains after mindfulness training occurred with both medium and low staff-resident ratios. Our results suggest that the addition of mindfulness training considerably enhanced the ability of the group home staff to effectively manage the aggressive behavior and learning of the individuals.

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1. Introduction

Aggression by individuals with developmental disabilities challenges the skills and patience of group home staff. This high intensity behavior is especially difficult to treat because it often occurs at a low frequency, thus affording staff members few opportunities to use the behavioral contingency management techniques that they have been taught. Furthermore, group home staff members are often less qualified and experienced in treating these behaviors than are their counterparts in state developmental centers.

Aggression can be controlled, managed or treated in a number of ways. Pharmacotherapy is often the intervention of choice for aggression that has an affective component or that occurs at a rate and intensity that poses imminent danger to self or others (Ellis, Singh, & Singh, 1997). Psychosocial interventions, including behavioral and cognitive-behavioral interventions, are typically used when individuals with developmental disabilities use aggressive behaviors as instrumental responses to communicate or attain desired ends (Matson & Duncan, 1997). Most research literature on behavioral interventions focuses on contingency management of aggression, despite growing evidence that it is the overall quality of one's environment that provides the context for his or her constructive versus disruptive behavior (Sameroff, 1995). Indeed, staff training in developmental centers and community group homes heavily emphasizes contingency management techniques to treat the challenging behaviors of individuals rather than implement contextual strategies to maintain their wellness.

Developmental centers and community group homes that focus on developing and enhancing wellness provide an environment conducive to personal and functional growth of the individuals they serve. The therapeutic milieu includes every aspect of the physical, social, treatment and emotional ecology of the setting in which service delivery takes place. Such an environment fosters and develops the strengths of not only the individuals being served but also the staff, as both are part of the therapeutic milieu.

One of the indicators of a facilitative therapeutic milieu is that the staff adheres to a person-centered service delivery system (Rogers, 1977). Staff members are able to anticipate and respond to each individual's needs as if they are able to see the world through the eyes of that individual. This shift in staff culture from controlling or managing the behavior of individuals to providing a therapeutic milieu as a setting event for positive personal and functional growth, necessitates staff members acquiring broad-based skills that will enable them to respond appropriately to the changes in each individual's needs and behaviors. These skills include developing a therapeutic alliance and empathy with each individual so that they can respond to his or her behaviors firmly, but with nonjudgmental acceptance and loving kindness. Such skills are often associated with mindfulness-based approaches to human interaction (Hanh, 1987; Kabat-Zinn, 1990, 1994; Kornfield, 1993; McLeod, 2001).

Mindfulness and mindfulness-based interventions are being used increasingly to change one's own behavior as well as to help others achieve wellness (for reviews, see Hayes, Follette, & Linehan, 2004; Segal, Williams, & Teasdale, 2002). Mindfulness leads to a clear, calm mind that is focused in the present and is aware of both external and internal conditions. Thus, a mindful staff member will attend not only to what is unfolding in the external environment (e.g., an individual is getting upset and aggressive), but also to what is occurring in his or her internal environment (e.g., changes in his or her own emotional state as a consequence of the individual's aggressive behavior).

Recently, we used mindfulness-based interventions to enable one individual to control his aggressive behaviors (Singh, Wahler, Adkins, Myers, & The Mindfulness Research Group, 2003),

and another her obsessive-compulsive behaviors (Singh, Wahler, Winton, Adkins, & The Mindfulness Research Group, 2004). In a series of studies, we taught mindfulness to treatment team members as a way to help them be more family-friendly (Singh et al., 2002a, 2002b), to more fully integrate behavioral and psychopharmacological interventions for their clients (Singh et al., 2002a, 2002b), and to engage more fully in the treatment team process in an inpatient psychiatric hospital (Singh et al., 2006). Singh et al. (2004a) also demonstrated that increasing the mindfulness of caregiving staff increases the levels of happiness in adults with profound multiple disabilities.

In this study, our aim was to assess whether behavioral and mindfulness-based training given to staff members in group homes enables them to provide better care of the individuals living there. Specifically, we were interested in whether, following behavioral and mindfulness-based training, staff would have to deal less often with aggressive behaviors and the individuals' learning of daily living skills would show a concomitant increase within the therapeutic milieu.

2. Method

2.1. Participants

Fifteen group home direct care staff members participated. They were typically scheduled to work the first shift of the day, from 7.30 am to 4.30 pm. They ranged in age from 22 to 38 years (mean = 30) and had worked as direct care staff with individuals with developmental disabilities for 3–7 years (mean = 5.6). Ten of the 15 staff members were men. As part of their introductory orientation training all had been provided with brief training in behavioral procedures.

The staff was responsible for 18 individuals, 6 in each group home. The individuals ranged in age from 25 to 47 years (mean = 36), and all had either severe or profound mental retardation. One individual in Group Home 1, three in Group Home 2, and two in Group Home 3 had Axis I diagnosis of mental illness. All six of these individuals engaged in aggression. Five other individuals (two, one and two in Group Homes 1, 2, and 3, respectively), none with a diagnosis of mental illness, also engaged in aggression. These 11 individuals were on behavior support plans developed on the basis of a functional analysis of their aggressive behaviors and on psychotropic medications to control their Axis I psychiatric disorders. All 18 individuals in the three group homes had person-centered habilitation plans that included a number of skill training programs based on task analysis.

2.2. Design

We used a multiple baseline design across the three group homes. The staff members in each home were given two forms of training, first behavioral and, later, mindfulness. Staff-resident (staffing) ratios were varied following each form of training. Following behavioral training, the staffing ratios used in three consecutive conditions were 1:2, 2:3, and 1:2. After mindfulness training two consecutive staffing ratio conditions were used, 1:2 and 1:3. (With six individuals in each group home, there were three staff members when the ratio was 1:2, four staff members when the ratio was 2:3 and two staff members when the ratio was 1:3.)

2.3. Procedure

2.3.1. Baseline

Baseline data were collected in all three group homes for 4 weeks prior to the 5-day behavioral training for the 18 staff. During baseline, the staff-resident ratio was 1:2.

2.3.2. Behavior training conditions

When the group home staff members had been hired, they had received a 2-h orientation in the principles and application of behavior management when providing services to people with developmental disabilities. They had not received any further training in behavior management until this study. Immediately following baseline assessments, the 18 group home staff members participated in a 5-day intensive training program in behavior management based on the Miller (1997) text. In addition to those in the text, the trainer used examples from the experiences of the participants to illustrate the application of behavioral interventions. The use of aversive contingencies was neither taught nor modeled in the course.

Table 1
Topics covered in the 5-day staff mindfulness training program

Day	Topics
1.	<p>Concepts of mindfulness and mindlessness; philosophical differences between behavioral staff training and mindfulness staff training; external vs. internal contingencies; focus on how to change one's own behavior so that it may positively affect others; holistic, ecological and transactional perspectives; introduction to mindfulness in everyday life</p> <p>Mindfulness in everyday life: being open to new information; being able to see old information in new ways; having an awareness of multiple perspectives; avoiding premature cognitive commitment; understanding mindfulness and mindlessness; appreciating the positive aspects of mindlessness; not one, not two, but one and two at the same time</p> <p>Introduction to meditation postures (floor sitting, chair sitting, walking, rhythm of life); mindful breathing and the conscious returning of attention to the breath when the mind wanders away; objective viewing of the mind</p> <p>Exercises and homework practice</p>
2.	<p>Mindfulness in wisdom traditions, with particular emphasis on Hindu and Buddhist wisdom traditions</p> <p>Practice meditation postures (floor sitting, chair sitting, walking, rhythm of life); mindful breathing and the conscious returning of attention to the breath when the mind wanders away; objective viewing of the mind</p> <p>Mindfulness exercises and homework practice</p>
3.	<p>Understanding and using various methods to enhance mindfulness: non-judging; patience and perseverance; a beginners mind; trust; non-striving; acceptance; letting go; doing without a focus on personal reward</p> <p>Practice meditation postures (floor sitting, chair sitting, walking, rhythm of life); mindful breathing and the conscious returning of attention to the breath when the mind wanders away; objective viewing of the mind</p> <p>Mindfulness exercises and homework practice</p>
4.	<p>Understanding and using various methods to enhance mindfulness (continued): active observation of oneself, other, and the "problem"; accepting life as it is; knowing and experiencing "I am not my thoughts"; being compassionate; listening with calm attention; seeing through other's eyes; engaging in loving kindness; being in the present moment</p> <p>Practice meditation postures (floor sitting, chair sitting, walking, rhythm of life); mindful breathing and the conscious returning of attention to the breath when the mind wanders away; objective viewing of the mind; you are not your thoughts</p> <p>Mindfulness exercises and homework practice</p>
5.	<p>Work and play as mindfulness practice (putting it all together in daily life): applications of mindfulness in family life, at work and during play; overcoming history of mindless work behaviors and feeling the spirit within; experiencing the present moment; being loving, kind, compassionate and interacting with wisdom as a way of life</p> <p>Practice meditation postures (floor sitting, chair sitting, walking, rhythm of life); mindful breathing and the conscious returning of attention to the breath when the mind wanders away; objective viewing of the mind</p> <p>Mindfulness exercises and homework practice</p>

The staffing ratios following behavioral training are described below.

2.3.2.1. Staffing ratio 1:2. In the initial condition following behavioral training, the staff-resident ratio remained at 1:2. This condition lasted 8, 13, and 18 weeks across the three group homes, respectively.

2.3.2.2. Staffing ratio 2:3. This condition was the same as previously except that the staff-resident ratio was raised to 2:3. This condition lasted 14, 20, and 22 weeks across the three group homes, respectively.

2.3.2.3. Staffing ratio 1:2. This condition was the same as previously except that the staff-resident ratio reverted to 1:2. This condition lasted 8, 10, and 13 weeks across the three group homes, respectively.

2.3.3. Mindfulness training conditions

Following the end of the third and before the start of the fourth staffing condition (i.e., the third 1:2 staffing condition), the same staff participated in a 5-day intensive mindfulness training that included didactic instruction, practice in meditation and mindfulness-enhancing exercises. The didactic instruction included the basic underpinnings of mindfulness as experiential phenomena, mindfulness in everyday life, mindfulness as understood in various wisdom traditions, characteristics of mindfulness, work as mindfulness practice, and putting these all together in one's life (Epstein, 1999; Hanh, 1987; Kabat-Zinn, 1990, 1994; Kornfield, 1993; Langer, 1989). An outline of the training sessions is presented in Table 1. In addition, each day of mindfulness training included instruction and practice of various meditation techniques (Bhikkhu, 1996; Flickstein, 1998; Hanh, 1987; see Table 2 for an example of a meditation exercise) and exercises to enhance mindfulness (see Table 3 for an example of a mindfulness exercise).

The staffing ratios following mindfulness training are described below.

2.3.3.1. Staffing ratio 1:2. In the initial condition following mindfulness training, the staff-resident ratio remained at 1:2. This condition lasted 19, 24, and 20 weeks across the three group homes, respectively.

2.3.3.2. Staffing ratio 1:3. This condition was the same as previously except that the staff-resident ratio was lowered to 1:3. This condition lasted 15, 13, and 17 weeks across the three group homes, respectively.

2.4. Data collection

Data were collected on the following variables.

2.4.1. Staff intervention for aggression

Staff interventions for aggression by the individuals were recorded each time they occurred. Aggression was defined as an assault on another individual or staff member in any manner, or any intentional act against any property that was meant to break, damage, or destroy it.

Table 2
Example of a meditation exercise

Calming the Mind^a

1. Close your eyes.
2. Close your mouth and breathe through your nose.
3. Feel the sensation of your breath as it flows in and out of your nostrils at the tip of your nose. You may feel the sensation more strongly within the nostrils or on the upper lip.
4. To help you locate where you feel the touch sensation of the breath most distinctly, inhale deeply and force the air out through your nostrils. Wherever you feel the sensation most clearly and precisely is the place to focus your attention during your meditation sessions.
5. Feel the beginning, the middle, and the end of every in-breath, and the beginning, the middle, and the end of every out-breath.
6. Sometimes the breath will be short—there is no need to make it longer. Sometimes the breath will be long—there is no need to make it shorter. Sometimes the breath will be erratic—there is no need to even it out.
7. Just become aware of the breath as it goes in and out of the nostrils at the tip of the nose.
8. Feel the beginning, the middle, and the end of every in-breath, and the beginning, the middle, and the end of every out-breath.
9. Let the breath breathe itself.
10. Every time your attention moves away from the breath and shifts to a different object of awareness, such as a physical sensation or a thought, gently but firmly draw your attention back to the touch sensation of your breath.

Mindfulness exercises and homework practice.

^a Adapted from Flickstein (1998).

2.4.2. Learning objectives performed independently

The staff was responsible for teaching the individuals a number of daily living skills as prescribed in each resident's habilitation plan. Staff recorded each learning objective that was

Table 3
Example of a mindfulness exercise

Being in the present moment

1. This exercise will help you to empty your mind so that you can focus entirely on the present moment.
2. Choose a task that you perform with an individual every day that you can do automatically, almost without thinking.
3. Before you begin this task, resolve that today you will tell yourself exactly what you are doing when you perform this task. For example, if you are teaching an individual to use an electric can opener, you might maintain an internal commentary on each step of the process. To help you focus on each step, you may use the word "now" to describe each step. For example, you may begin this way: I am now showing John how to use an electric can opener. I am now holding the can to the side of the can opener. I am now attaching the can to the can opener . . . and so on, until the task is completed.
4. At your next break, find a quiet spot and analyze the effect that providing yourself with a commentary had on you. Did you see and experience things that you had not noticed before? Did you see the subtle changes in John's facial expressions when you showed him the different steps of the task? Did John say anything when you were teaching him? Did you find the act of demonstrating the task to be different from other times you have done this in a routine manner, almost without thinking of what you were doing? Try to visualize each action that you took to teach John. What emotional responses did this produce in you?
5. Each day pick a different activity at work and repeat this exercise.
6. To enhance mindfulness at home, each day choose a task that you engage in at home and provide yourself with an internal commentary until you reach the point that you are fully present in each moment.

mastered to competency by each individual. Each component of the task analysis for each skill training objective was defined as a learning objective.

2.4.3. *Use of emergency physical restraints*

When staff members were unable to control the aggressive behavior of the individuals and there was imminent danger to the individuals, or peers and/or staff, they were instructed to use brief physical restraints for safety purposes. Each use of physical restraint was recorded.

2.4.4. *Socially integrated activities*

Staff recorded the number of times each individual interacted with family and others (i.e., excluding peers and staff paid to provide support) in his or her community each week (Horner, Sprague, & Flannery, 1993).

2.4.5. *Physically integrated activities*

Staff recorded the number of times each individual performed activities (e.g., shopping) in the local community in a manner similar to those of their nondisabled same-age peers (Horner et al., 1993).

2.4.6. *Staff satisfaction with their work*

During baseline and in each staffing condition staff members rated their overall satisfaction with the work they were doing and the progress they were making with the individuals in their care on a 100-point scale, with 0 = totally dissatisfied, 50 = satisfied, and 100 = totally satisfied.

2.4.7. *Social validation of staff behavior*

Ideally, we would have had all individuals rate their satisfaction with the way the staff attended to their care, well-being and treatment. However, given the level of their functioning and our lack of expertise in having them rate their satisfaction in a meaningful, reliable and quantitative manner, we obtained social validation data from their parents and friends. In all, 36 parents and friends (2 per individual) rated their satisfaction with the way the staff interacted with and provided services to their family member or friend. They rated them once during baseline and once in the last week of each of the other six conditions, on a 100-point scale, with 0 = totally dissatisfied, 50 = satisfied, and 100 = totally satisfied.

2.5. *Reliability of data*

The direct care staff collected the primary data. An independent rater also collected data in each of the group homes, once a week, on a random basis. The overall reliability across all variables on which data were collected ranged from 83 to 100%, with a mean of 91.5%.

3. Results

Fig. 1 presents the weekly data for both the number of staff interventions for aggression and the number of learning objectives mastered by the individuals in the three group homes. In general, the number of staff interventions for aggressive behavior was moderately high across the three group homes during baseline ($M = 20.9$). During the three staffing conditions following behavioral training there was a small overall reduction ($M = 18.4$), with clinically insignificant differences across the three conditions. Following mindfulness training, the number of staff

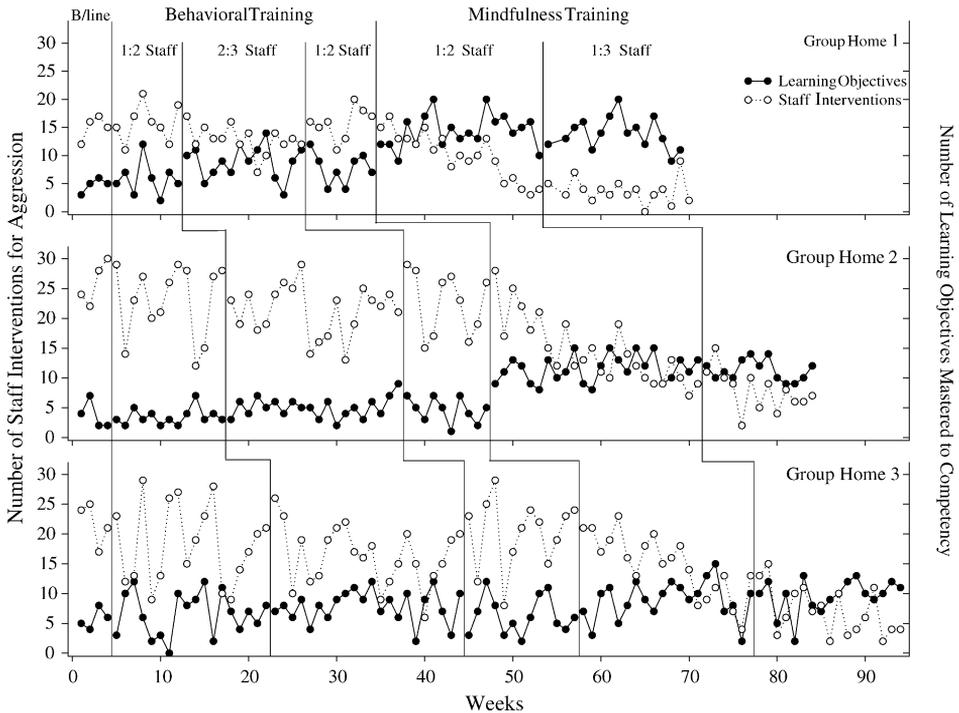


Fig. 1. Number of staff interventions for aggression and number of learning objectives mastered to competency across the three group homes during baseline and following behavioral and mindfulness training.

interventions for aggressive behavior decreased substantially across the three group homes during the 1:2 staffing condition ($M = 13.1$) and further decreases were evident during the 1:3 staffing condition ($M = 6.2$).

The individuals mastered few learning objectives per week during baseline ($M = 4.8$). Following behavioral training, there was almost no change across the three group homes during the initial 1:2 staffing condition ($M = 4.9$), an increase during the 2:3 staffing condition ($M = 7.3$) followed by a slight fall during the second 1:2 condition ($M = 6.2$). In the 1:2 staffing condition that followed the mindfulness training, however, learning improved substantially ($M = 11.6$) and, even when the staffing ratio was decreased to 1:3, remained at this level ($M = 11.6$).

Table 4 summarizes the data in each condition for all variables assessed, separately for each group home. It shows that the socially and physically integrated activities across the three group homes were at low levels during baseline ($M = 2.1$ for social and 8.0 for physical) and across the three staffing conditions following the behavioral training ($M = 2.9$ for social and 9.2 for physical). Following mindfulness training, there were substantial increases in the numbers of both socially and physically integrated activities the individuals engaged in during the 1:2 staffing condition ($M = 5.3$ for social and 13.7 for physical) which increased further during the 1:3 staffing condition ($M = 7.2$ for social and 18.5 for physical).

The use of physical restraints to control aggressive behavior during baseline was quite high in all three group homes ($M = 12.0$). Following behavioral training, its use decreased overall ($M = 7.4$) although to a variable degree in the three group homes and across the three staffing conditions (see Table 4). It reached the lowest levels in all homes ($M = 5.3$) during the higher

Table 4
Primary and secondary variables across staffing conditions

Variable	Setting	Baseline	Behavioral training			Mindfulness training	
		1:2 staffing	1:2 staffing	2:3 staffing	1:2 staffing	1:2 staffing	1:3 staffing
Staff interventions	Gp Home 1	15.0	15.8	12.9	15.8	10.0	3.7
	Gp Home 2	26.0	23.0	21.2	22.6	14.6	7.9
	Gp Home 3	21.8	18.2	16.4	20.2	14.8	7.0
Learning objectives mastered	Gp Home 1	4.8	5.2	8.9	7.8	14.4	13.9
	Gp Home 2	3.8	3.5	5.0	4.6	11.5	11.2
	Gp Home 3	5.8	6.1	7.9	6.3	9.0	9.6
Socially integrated activities	Gp Home 1	2.1	3.5	4.0	3.7	7.8	9.5
	Gp Home 2	1.3	2.1	2.3	2.0	4.3	6.5
	Gp Home 3	2.8	2.9	2.7	2.5	3.9	5.7
Physically integrated activities	Gp Home 1	7.8	10.0	11.2	9.8	15.3	21.4
	Gp Home 2	8.2	8.6	8.9	8.4	12.5	17.3
	Gp Home 3	7.9	7.7	9.5	8.7	13.2	16.8
Use of restraints	Gp Home 1	12.0	8.0	6.0	8.0	0.0	0.0
	Gp Home 2	13.0	10.0	7.0	7.0	2.0	0.0
	Gp Home 3	11.0	9.0	3.0	9.0	1.0	0.0
Staff satisfaction	Gp Home 1	53.0	55.0	62.0	48.0	74.0	84.0
	Gp Home 2	45.0	43.0	51.0	40.0	71.0	91.0
	Gp Home 3	53.0	51.0	56.0	43.0	77.0	88.0
Social validation satisfaction	Gp Home 1	61.0	69.0	73.0	73.0	88.0	94.0
	Gp Home 2	58.0	58.0	64.0	64.0	92.0	96.0
	Gp Home 3	63.0	61.0	65.0	64.0	87.0	93.0

staffing ratio (2:3) condition. Following mindfulness training, physical restraints were used at very low levels in the 1:2 staffing condition ($M = 1.0$) and not at all, in any group home, under the lower 1:3 staffing condition.

The staff members' satisfaction with the work they were doing and the progress they were making with the individuals in their group homes was relatively low during baseline ($M = 50.3$) and this continued across the behavioral training conditions ($M = 49.9$), although the level rose during the higher staffing ratio (2:3) condition ($M = 56.3$). Immediately following mindfulness training, however, their satisfaction increased substantially during the 1:2 staffing condition ($M = 74.0$) and even more so during the condition when the staffing was reduced to a 1:3 ratio ($M = 87.7$).

Social validation of staff behavior, as rated by parents and friends of the individuals being served, were at moderate levels during baseline ($M = 60.7$) and showed a modest increase across the three staffing conditions following behavioral training ($M = 65.7$). They increased substantially during the final two staffing conditions that followed the mindfulness training ($M = 89.0$ and 94.3 , respectively).

4. Discussion

Our data show that, following intensive behavioral training, there were minor reductions from baseline in the number of staff interventions for aggressive behavior and very little change in the

number of learning objectives mastered. It must be remembered, however, that although staff members were given training in general behavior management principles, they were not required to develop and implement specific contingency management techniques for the individuals' aggressive behaviors; neither were they required to develop any learning-based objectives. This was because the emphasis in the study was to examine the behavior of staff members in a therapeutic milieu rather than assess their ability to develop and implement formal behavior-reduction plans. Indeed, we know from the research literature that developmental center and community group home staff can be taught to develop and implement specific behavior reduction plans and learning-based objectives with great success (see Singh, 1997).

By comparison, mindfulness training was followed by clinically significant effects under both staffing conditions; the number of staff interventions for aggressive behavior decreased and the number of learning objectives mastered by the individuals increased. As with the behavior management training, we did not teach the staff mindfulness techniques that focused specifically on reducing aggression or teaching learning objectives to the individuals. As we reported earlier, teaching staff members to be more mindful of their own behaviors and to act more mindfully towards others increases the social behaviors of individuals in their care (Singh et al., 2004a). The current study provides evidence that mindfulness training enables staff members to respond to the needs of these individuals in the therapeutic milieu in a way that reduces the individuals' challenging behaviors and increases their learning and social behaviors.

Another important finding is that, when compared to baseline, physical restraints for aggressive behavior were used less in all three group homes following both behavioral training and mindfulness training. These reductions, however, were much greater following mindfulness training. Further, when compared to baseline, the average number of socially and physically integrated activities increased following both behavior management and mindfulness training, but with considerably greater increases being evident following mindfulness training.

Staff satisfaction data showed that staff members were most satisfied following mindfulness training. Further, when compared to baseline, the social validation data showed that the staff was rated highly by parents and friends of the individuals following behavior management training and even more highly following the mindfulness training.

It is not possible to rule out sequence effects as the reason for the finding of much greater improvements in all measures following mindfulness training. Whether these same improvements would have been evidenced had behavior management training not been given, or had it been given after the mindfulness training, remains to be determined. However, the large effects after mindfulness training, when compared with those after behavioral training, suggest a weak sequence effect, if any. Not only did the effects always get larger after mindfulness training in the medium value staffing ratio (1:2), they always increased much further when the condition changed to the lowest staffing ratio (1:3). The improvements after behavioral training were not only modest, but also, they typically reversed in the last condition before mindfulness training, when the staffing ratio decreased from the highest (2:3) to a medium value (1:2). Also, the levels obtained during the highest value were always considerably lower than in either condition after mindfulness training.

Overall, the data strongly suggest that mindfulness training helped the group home staff provide person-centered care that was effective in reducing aggression by the individuals and in increasing their learning. The question arises as to why mindfulness training produced this transformational change in the staff. While this question may be answered more definitively in future studies, we think that there are a number of possibilities to consider. First, mindfulness encourages unconditional acceptance of oneself, including one's actions, and others and their

actions. Unconditional acceptance of the individuals, regardless of their challenging behaviors, may have enabled the staff to build a stronger alliance with them. That is, the staff refocused its attention from the individuals' challenging behaviors to seeing the individuals as persons. This may have changed the staff's attitudes toward the individuals and it could have been this attitudinal transformation in the staff, rather than any knowledge of specific theories or behavior-change techniques, that facilitated the change in the individuals' learning and behavior.

Second, the related mindfulness concept of nonjudgmental acceptance may also have played a role in the outcomes evidenced in our study. That is, mindful staff members may not categorize an individual's behaviors as either positive or negative but may accept them as simply behaviors. Thus, they do not respond to challenging behaviors as negative behaviors that need to be immediately controlled or eliminated. Rather, they respond in a manner that enables the individuals in their care to respond differently to the same situation. This change in the staff-individual interaction puts their future interactions on a more positive transactional pathway where the behaviors will alter as a result of the changed therapeutic milieu, rather than because of changes in specific environmental contingencies (Sameroff, 1995).

Third, mindfulness produces calm attention that staff could have used to reduce escalation of situations that typically lead to challenging behaviors. This may have directly triggered positive reactions from the individuals and replaced former negative behaviors by staff that had been precursors to further challenging behavior in the individuals. Indeed, anecdotal staff reports suggested that staff members used calm attention to instill peace and calmness in both themselves and individuals during stressful situations.

Fourth, practicing mindfulness enables us to empty our minds of preconceived notions of another's behavior (Suzuki, 1970). Emptying our minds in this way, gives us a beginner's mind; a mind that is able to see positive possibilities where none, or only negative possibilities, were envisioned previously. Mindful staff members may have developed the ability to see and use positive ways of interacting with the individuals when compared to their previously negative interactions. When the cycle of negative staff-individual interactions is broken, more positive outcomes arise.

Fifth, when staff members are mindful, they may become more responsive to each moment of their interactions with the individuals in their care. Developing calm acceptance of whatever behaviors are exhibited, without attempting to impose their will on the situation, minimizes the amount of energy used and the build-up of any resistance. This effortless action, in which staff members are able to blend their efforts into the natural flow of life itself, is the Taoist principle of Wu Wei. With experience and practice they are able to enter the Wu Dao dance, the continual giving and receiving of wisdom (Mitchell, 1988; Walker, 1992). In time, staff and individuals begin to learn from each other and the therapeutic milieu provides many positive experiences for both.

Although necessarily speculative, there are some aspects of mindfulness training and meditation practice that could potentially be linked to brain functioning and neural plasticity. The few empirical investigations concerning the linkage between the brain and meditation practice have almost exclusively documented changes that take place during a meditative state compared to a control condition (e.g., Jevning, Anand, Biedebach, & Fernando, 1996; Lou et al., 1999). However, a recent study by Davidson et al. (2003) examined both immediate and long-term effects of training in mindfulness meditation techniques on brain and immune function. These researchers reported a relative left-sided hemispheric asymmetry in anterior EEG activation in those participants who completed an 8-week mindfulness meditation training program, immediately following the training and 4 months after completion of the

training, compared to a control group that did not receive mindfulness training. Prior to training, there were no differences in asymmetric EEG activation between the two groups. This pattern of left hemispheric EEG activation asymmetry has been associated with both state and trait components of positive affect in numerous studies by Davidson and his colleagues (e.g., Davidson, Ekman, Saron, Senulis, and Friesen (1990); also see Davidson, Jackson, and Kalin (2000) for a comprehensive review of this area). In addition, these researchers reported an increase in immune function in those who participated in the mindfulness training compared to the control group.

The Davidson et al. (2003) study is a clear, although preliminary, demonstration that mindfulness meditation practice does have a measurable impact on brain functioning. Davidson et al. (2000) have suggested that such hemispheric EEG activation asymmetry is most likely plastic, and could be shaped by some form of training. The implication of the change in brain functioning found in the Davidson et al. (2003) study is that processes of neural plasticity underlie the observed shift in EEG activation. The finding from this study is very specific, and it is unclear exactly what neural processes underlie EEG hemispheric asymmetry. However, the finding does support the overwhelming data indicating that plasticity is an inherent property of the brain, and that the ability to be modified by experience is a characteristic of many brain systems, regardless of their specific function (e.g., Huttenlocher, 2002; Nelson, 1999).

Our study provided clear evidence that mindfulness practice had a positive impact on the interactions between staff and individuals with developmental disabilities at the level of observable behavior. One characteristic of the staff who had undergone mindfulness training was that they appeared to be very involved with the individuals being cared for, and were observed to be more responsive, patient, creative, and adaptable during their care giving interactions. Generally, such characteristics reflect behavioral manifestations of executive functioning. Executive functioning is subserved at the neural level by the prefrontal cortex and associated networks, and is reflected behaviorally in higher-level cognitive functions such as memory, attention, flexible problem solving, and inhibition. The behaviorally observed increase in these caregivers' ability to focus sustained attention on a task may reflect more efficient or focused allocation of attentional resources, one aspect of executive functioning. In addition, greater creativity and adaptability are likewise central aspects of executive functioning. One hypothesis stemming from this finding is that mindfulness meditation practice may serve to enhance executive functioning. This could be tested by administering a neuropsychological assessment of executive functioning, such as the computer-based Cambridge Neuropsychological Testing Automated Battery (CANTAB), which has been widely and successfully used in a variety of populations (Fray, Robbins, & Sahakian, 1996).

However, caution must be exercised when extrapolating from changes in discrete, narrowly defined behaviors associated with mindfulness training and practice to imputing changes in the organism at the biological or brain level. In order to directly test hypotheses concerning the impact of mindfulness practice on biological systems, carrying out studies that measure specific aspects of biological functioning, such as that carried out by Davidson et al. (2003), will be essential. It is possible (if not probable) that mindfulness meditation practice does have an impact on a wide range of biological systems in humans, including the brain, neuroendocrine and immune system functioning, and neurochemical processes. Brain imaging techniques, such as functional magnetic resonance imaging (fMRI), would provide an ideal tool for directly examining the impact of mindfulness and meditation practice on the brain, as well as many other tools available to examine both the brain and other biological systems. Finally, a multiple levels

of analysis approach, integrating data from diverse biological and psychosocial systems, advocated by researchers in the field of developmental psychopathology (e.g., Cicchetti & Dawson, 2002) and in the study of resilience (e.g., Curtis & Cicchetti, 2003), would be a suitable strategy to investigate the impact of mindfulness practice on human functioning.

In conclusion, our study has provided evidence for the value of training group home staff in mindfulness practice as a way to better serve the individuals in their care. On a variety of measures, some improvement was obtained after staff members were given behavioral training, but much greater improvements on these measures followed mindfulness training. While sequence effects could have occurred, there was good evidence that mindfulness training produced strong positive outcomes, consistent with a growing literature that supports the therapeutic gains that result from giving caregivers this type of training.

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