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Depressed Nursing Home Residents' Activity Participation and Affect as a Function of Staff Engagement

Suzanne Meeks and
University of Louisville

Stephen W. Looney
Medical College of Georgia

Abstract

Behavioral interventions for depression target activity engagement and increased positive reinforcement, particularly from social interaction. Nursing homes provide limited opportunity for meaningful social engagement, and have a high prevalence of depression. Often residents obtain most of their social contacts from staff members. We present intra-individual correlations among positive staff engagement, resident affect, and resident activity participation from behavior stream observations of residents who were participants in an ongoing trial of an intervention for depression. Sixteen residents were observed 6 times weekly for 8–45 weeks, five minutes per observation. Positive staff engagement during the observations was significantly correlated with resident interest and pleasure. Positive staff engagement was related to resident participation in organized group activity, however, residents tended to be more engaged and show more pleasure when in informal group activities, especially those residents receiving the behavioral treatment. Positive staff engagement was not related to time in activities of daily living. Results have implications for understanding mechanisms and potential targets of interventions for depression.

Depressed Nursing Home Residents' Activity Participation and Positive Affect as a Function of Staff Positive Engagement

Depression is a major focus of mental health care in nursing homes because of its high prevalence among the frail elders who reside in them (e.g., Katz & Parmelee, 1997; Teresi, Abrams, Holmes, Ramirez, & Eimicke, 2001). Although there is relatively little empirical evaluation of interventions for depression in nursing home residents, behavioral interventions have received some attention and appear to be promising (e.g., Lichtenberg, Kimbarow, Wall, Roth, & MacNeill, 1998; Meeks & Depp, 2002; Meeks, Looney, Van Haitsma, & Teri, 2008). Behavioral interventions for depression derive primarily from the work of Peter Lewinsohn, whose model emphasized the importance of response-contingent positive reinforcement, or increasing pleasant events that result in positive affect (Lewinsohn, 1975; Lewinsohn, Hoberman, Teri, & Hautzinger, 1985). Lewinsohn's original formulation privileged social interaction as a critical aspect of behavior that can lead to necessary positive reinforcement (Lewinsohn, 1975; Lewinsohn & Graf, 1973). Depressed individuals have been found to engage in fewer interpersonal interactions that can lead to positive reinforcement from others (Achterberg et al., 2003; Libet & Lewinsohn, 1973), and lack of positive social interaction might be particularly problematic among older adults with physical and cognitive impairments.

Nursing homes are unique social environments; nursing home residents may have fewer contacts with friends and family members in their natural social networks, and traditional nursing home rooms offer limited privacy in a medicalized environment. Social interactions and activity are relatively infrequent (e.g., Kolanowski & Litaker, 2006; Logsdon, 2000). Nursing home staff members have special importance in this environment as the most likely providers of social reinforcement. However, a survey of 10 nursing homes found that nursing staff rarely engaged in social interactions during mealtimes and did not see this as an important part of their duties (Pearson & Fitzgerald, 2003). In another study (Stabell, Eide, Solheim, Solberg, & Rustøen, 2004), staff members rarely engaged in social engagement-supporting responses to residents, and primarily were engaged in dependence-supporting responses. Kolanowski and Litaker (2006) found that, for cognitively impaired residents, social interactions were associated with increased agitation, perhaps due to the fact that often these social interactions were occurring with other residents and were brief and therefore not of high quality. Based on these findings, it seems reasonable to hypothesize that the success of behavioral interventions in nursing homes may be related at least to some extent to increasing positive staff-resident interactions.

In this study, we used data collected during systematic behavioral observations of participants in an ongoing clinical trial to examine the relationships between positive staff engagement and resident activity level and affect. We hypothesized that staff members would be more likely to be positively engaged with residents when residents were engaged in organized group activities, and that when staff members were positively engaged with residents, residents would show more positive affect (pleasure and interest).

Method

Data presented here were collected during an ongoing clinical trial of BE-ACTIV, a behavioral intervention for depression in nursing homes that emphasizes activation and pleasant events (see Meeks et al., 2008, for a description of the intervention). The design of the clinical trial employed cluster randomization at the facility level: facilities, stratified by size, were randomly assigned to either treatment as usual or BE-ACTIV conditions. Residents within facilities were included if they were in a long term care bed, had a depressive disorder as diagnosed with a structured clinical interview (major or minor depression, dysthymia), and had a Geriatric Depression Scale (GDS; Yesavage et al., 1983) score of 12 or above at the time of entry into the study. Exclusion criteria include Mini Mental Status Exam (MMSE; Folstein, Folstein, & McHugh, 1975) score below 14 (indicating insufficient cognitive ability to complete self-report instruments reliably), unstable medical condition, or likely terminal illness. Included residents in treatment facilities received 10 weeks of an individualized, behavioral intervention for depression from mental health therapists who were research staff members. Activities staff members in the treatment facilities received a three-hour training program on depression and were asked to assist with increasing pleasant activities. Activities staff members in the control facilities received a three-hour training program on dementia. No other facility staff members were explicitly involved in the study.

Participants

Participants were 16 residents from 5 nursing homes who had completed at least 12 weeks of data collection, through the treatment phase of the study. Six participants were in control facilities and 10 were in treatment facilities. Seven of the residents were men, the rest were women (9); 13 were white and 3 were African American. They ranged in age from 54 to 100 with a mean age of 74.75 (SD=12.89). They had a mean GDS score of 17.87 (SD= 3.46). Twelve were diagnosed with a current major depressive episode, three had diagnoses of

depressive disorder due to a general medical condition, and one had a diagnosis of minor depressive disorder.

Measures of Activity, Mood, and Staff Engagement

Participants' affect and activity levels were recorded using the *Observer* system (Noldus, 2000). The *Observer* permits live data collection with a hand-held computer that serves as an event recorder, permitting simple recording and downloading of complex observational data. Observations were made for 5-minute intervals during weekday times when residents were more likely to be engaged in activities (between 9:30-11:30 a.m. or 2:00-4:00 p.m.). We coded four behavior classes: affect, type of activity, level of resident participation, and level of staff participation. Within each behavior class, codes were mutually exclusive (state) codes, and the *Observer* program recorded durations of each state for each five-minute observation period. The affect measure is a modified version of the PGC Observed Affect Rating Scale (Lawton, Van Haitsma, & Klapper, 1996), including ratings on 4 mutually exclusive affects: pleasure, anger, anxiety/fear, and sadness (Lawton, Van Haitsma, Perkinson & Ruckdeschel, 1999). The activity measure records what type of activity the resident is engaged in. We recorded resident level of participation (active/passive/distracted/disruptive), and used the "active" code to measure resident interest. Since interest was in a different behavioral class than the other affect codes, it was not mutually exclusive with the other affects. That is, residents could show both pleasure and interest, whereas they could not be coded as having both anger and anxiety, for example. Staff responding codes included positive, engagement, negative engagement, neutral, and ignore. The definitions of the codes examined in the present study are shown in Table 1.

A standardized coder training sequence was used to train undergraduate research assistants to conduct the observations. Coders completed a training tape that involved recognizing affect on faces of older adults, achieving a 75% correct recognition rate on those exercises. Then they memorized the coding manual and completed two quizzes on manual codes. They then practiced in nursing facilities with the hand-held computer until they were comfortable with the coding, and then practiced in pairs until coding reached a reliability criterion of a mean *kappa* of .75 across a week of observations, and a mean *kappa* of .75 on a criterion training tape that contained 10 vignettes. Random reliability checks were conducted periodically by sending all pairs of coders into facilities to code for five-minute blocks, and coders were required to re-code the criterion video approximately every 6 months. Reliability for the observation measures in our pilot work has been high, with intra-class correlation coefficients between raters for live observations ranging from .69 to 1.0, all $p < .001$.

We attempted to observe participants six times per week in both morning and afternoon segments of the day, randomly dispersed across the five weekdays. When weekday observations were missed, observers were permitted to make up observations on weekends, but the majority of observations occurred on weekdays. Approximately 7% of observations occurred on the weekends. The variables in the analyses are the total durations (in seconds) of each code during the observation periods.

Analysis Approach

We used a random effects regression model approach (RRM) as implemented with the MIXED procedure in the Statistical Analysis System (SAS), to first examine the intra-individual correlations among study variables, aggregating across observation points within subjects. In other words, for each subject, correlations were calculated between each pair of staff and activity and affect variables, and RRM's were used to account for the dependence among the observation points when determining statistical significance. Second, we

aggregated these correlations across participants, first within treatment and control groups, and then across all participants. Although our data set is not complete enough at this point to analyze for treatment effects *per se*, we did compare treated and untreated groups to determine whether staff engagement and activity were different between these groups. An alpha level of .05 was used to establish significance for all statistical tests.

Results

Table 2 shows the mean durations per observation of staff engagement, affective expression, and activity participation for all participants. The number of observations per resident is shown in Tables 3a and 3b; there were an average of 64.48 observations per resident ($SD=14.17$), distributed over 8-45 weeks, depending on how many follow-up observations had been completed for each resident. Inspection of Table 2 reveals, as might be expected by previous research, that during the majority of observations, no staff members were present at all. When staff members were present, they were somewhat more likely to be ignoring the resident than to be positively engaged. Negative engagement by staff was observed in only 2 of 1,026 observations included in this study. Similarly, residents were most likely to be showing no affect at all during observations, with pleasure being the most frequent affect displayed. Also consistent with previous research, residents spent the majority of observed time in no activity.

Tables 3a and 3b show the intra-individual and aggregated correlations between positive staff engagement and resident affect and activity participation for untreated and treated participants, respectively. Positive staff engagement was significantly associated with resident interest for all but one participant, and significantly related to pleasure for the majority of participants. Aggregated across all participants the correlations were moderate and significant: .39 for interest and .50 for pleasure, and were not significantly different between groups. As predicted, staff positive engagement was strongly associated with resident participation in organized group activities. For a few residents, particularly those who engaged in very little or no organized group activity, positive staff engagement occurred primarily during ADL care or while residents were walking or wheeling in the hallways.

Tables 4a, 4b, and 4c show correlations between resident interest and pleasure and resident participation in various types of activities. For all residents but two, interest and pleasure were significantly correlated. The table shows considerable individual differences among participants in the strength of association between positive affect and type of activities. More residents showed positive affect during informal than during organized group activities. Interest was commonly associated with all types of activities to some degree, but the strongest associations were with informal activities. In the aggregate, pleasure was related to both informal and organized activities, and there was also a significant association between pleasure and walking or wheeling in hallways.

There were interesting findings concerning group differences in the associations between affect and activity participation (shown in Table 4c). Participants who received the BE-ACTIV treatment were *less* likely to show interest during organized activities than those who did not receive the treatment, but *more* likely to show pleasure. Treated participants were more likely than control participants to show both interest and pleasure while in informal groups, and less likely than controls to show interest or pleasure while moving about the facility.

Because the above analyses aggregated observations over time, we also looked at within-subject mean comparisons between study phases (2-week baseline, 10-week treatment, two

follow-ups) to determine whether there were consistent differences over time in the average durations of positive affect, activity participation, and staff engagement, also using RRM models for individual participants. For the most part, there were no significant differences in positive staff engagement between baseline, treatment, and follow-up periods¹, although there was one control participant who showed a significant decline in positive staff engagement between baseline and follow-up periods. Patterns of change in the activity and affect variables examined in this paper tended to be idiosyncratic, so no consistent conclusions can be drawn about aggregate changes over time in this small sample.

Discussion

This study used direct observation of nursing home residents to examine the relationship between staff attention and resident affect and activity participation for a sample of depressed residents in a treatment trial. These depressed residents spent only about a third of the time they were observed actively engaged or interested in activities. They showed no affect more than two thirds of the time observed, and were coded as “null activity” approximately one-third of the time, on average. As expected, when residents were receiving direct, positive, staff attention, they were also more likely to be actively engaged in whatever activity was going on, and more likely to show pleasure. This type of staff engagement was present, on average, during only about 10% of the time observed. The duration of positive staff engagement was associated with the duration of time spent in organized group activities. Given that, by definition, a staff member is present during organized groups, this finding is perhaps not surprising, but it suggests that the majority of positive staff engagement comes from activities staff members rather than nursing staff, despite the fact that nursing staff generally have more contact overall with residents. Positive staff engagement was generally not associated with daily care activities during the times we observed the residents. About half the residents appeared to elicit positive staff engagement while walking or wheeling about the facility.

Despite the fact that residents were most likely to receive positive staff attention during organized group activities, they also appeared to experience pleasure during informal group activities, that is, social interactions that involved casual interactions with staff, residents, or other visitors, or group activities not organized by staff members. In fact, more residents showed pleasure and interest in informal group activities than during organized groups. This finding may be related to the fact that residents spent more than three times as much time in informal activities as they did in organized group activities, so there was relatively little opportunity to observe positive affect during organized groups. However, it is also possible that residents had more control over their engagement in informal activities, and therefore they may have represented more preferred activities. This interpretation would be consistent with the finding that treated residents showed greater interest and pleasure in informal groups, because the focus of the intervention is to increase resident participation in preferred activities.

Our findings produced no evidence to suggest that residents' participation in a behavioral treatment protocol was related to staff behaviors, as the mean durations of positive staff attention were virtually identical in both groups, and there were no differences in the associations between staff attention and resident affect between groups. This may be because the only staff members who are the focus of the BE-ACTIV intervention are members of the Activities staff, and they would provide positive engagement during activities regardless of whether they received the intervention. Our observation protocol did

¹To keep the brevity of this article, we do not show these findings, but the single-subject time series results are available from the authors.

not permit recording of the type of staff member present during the observation period, but residents typically have the most contact with nursing assistants. Lack of social engagement by nursing staff members is consistent with previous research (Pearson & Fitzgerald, 2003; Stabell et al., 2004) and therefore does not appear limited to depressed residents or to be driven entirely by negative behaviors or affect of residents. Interventions that focus on nursing staff interpersonal engagement with residents during routine care and casual encounters might be an important area for further exploration that could yield greater opportunity for increasing positive affect regardless of the residents' overall level of activation.

The data analyzed here represent only a small portion of data from an ongoing clinical trial, and thus there is not sufficient power to analyze for treatment effects. The eventual availability of the full clinical trial data will permit exploration of causal pathways. Thus it will be important in the future to explore whether improvements in resident affect result in more positive engagement on the part of the staff, or whether changes in staff behavior precede improved resident affect (or both). It is also important to note that our observations of residents occurred during the times of the day most likely to capture organized group activities, and least likely to capture routine care such as dressing, bathing, and mealtimes. Thus we may not have captured the most positive interactions between nursing staff and residents, which could occur during these routine care periods.

Our purpose was to capitalize on a strength of our clinical trial design, the inclusion of repeated, direct, behavioral observations, in order to explore preliminary hypotheses concerning possible mechanisms of change. Our results support the contention that behavioral activation is related to increased positive affect; these results are consistent with earlier findings from a similar data set (Meeks, Young, & Looney, 2007). We did not find support for increased positive social interactions with staff as a likely mechanism of change for this sample. However, the results supported our hypothesis that positive staff engagement would be associated with positive affect for residents, and thus suggest that staff behavior could be a reasonable target for interventions to increase positive affect among depressed residents. Targeting nursing staff engagement might be especially important and powerful given that there appears to be relatively little positive engagement on the part of nursing staff during the daytime hours observed during this study.

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Table 1**Operational Definitions of Behavior Codes**

Observed Variable	Operational Definition
Positive Staff Engagement	Staff makes eye contact with resident, uses pleasant tone of voice, is physically oriented toward resident, content of conversation if applicable is pleasant, appropriate, or relevant/responsive to resident's needs.
No Staff	No staff member present within 20 feet of resident
Interest	Resident is alert and engaged in an activity. The resident is manipulating objects, physically active (e.g., exercises, tapping foot, singing, or clapping to music), or engaged in verbal exchanges.
Anger	Physical aggression, yelling, cursing, berating, shaking fist, drawing eyebrows together, clenching teeth, pursing lips, narrowing eyes. IF SADNESS INDICATORS PRESENT, CODE SADNESS.
Pleasure	Smiling, laughing, reaching out warmly to other, responding to music, singing, dancing/dancing in w/c, clapping, stroking or gently touching other, showing affection, kissing, flirting (when no other affect is displayed but pleasure)
Anxiety	Shrieking, repetitive calling out, restlessness (code whether it's due to boredom or anxiety), repeated or agitated movement, line between eyebrows, lines across forehead, hand wringing, tremor, leg jiggling, rapid breathing, eyes wide, tight facial muscles. IF ANGER OR SADNESS INDICATORS PRESENT, CODE ANGER OR SADNESS.
Sadness	Crying, frowning, eyes drooping, moaning, sighing, head in hand, eyes/head turned down and face expressionless (only if paired with another sign of sadness)
No Affect	No signs of emotion are being exhibited.
Organized Group	Resident is present with 1 or more other residents, staff, or visitors gathered for an activity and there is a clear leader or central focus for the activity. Ex.: musical performance, church service, bingo, trivia, crafts with a staff member or volunteer, current events discussion, exercise, physical therapy
Informal Group	Resident is present with 1 or more residents, staff, or visitors and an activity or socializing is taking place without a clear leader. Examples, conversation, working puzzles, crafts with no leader.
Activities of Daily Living	Resident engages in any of the following: dressing (putting on or taking off any clothes), grooming (brushing hair, toothbrushing, make-up, shaving), toileting (code if you are certain resident is using toilet even if door is closed), medications (taking pills, having blood pressure or temp taken), eating/drinking (including any behavior surrounding active approach to tray or food item e.g., use of utensils, wiping mouth, cutting food), or receiving treatments (e.g., bandaging, applying ointments or creams).
Walk/Wheel	Resident is walking or wheeling in a wheelchair and is not engaged in any other activity or conversation.

Table 2

Mean Durations (Standard Deviations) for Staff Engagement and Resident Activity and Affect.

Observed Variable	Controls	Treatment	All Participants
Positive Staff Engagement	31.54 (74.08)	31.12 (73.69)	31.30 (73.83)
No Staff	212.79 (119.30)	215.60 (119.51)	214.38 (119.37)
Interest	119.29 (122.62)	88.16 (114.09)	101.66 (118.81)
Anger	1.05 (5.40)	1.19 (8.42)	1.14 (7.38)
Pleasure	9.85 (28.27)	18.84 (46.93)	14.94 (40.15)
Anxiety	5.58 (21.97)	1.89 (11.88)	3.49 (17.10)
Sadness	1.99 (8.30)	2.36 (12.61)	2.21 (10.95)
No Affect	274.54 (47.98)	267.69 (62.83)	270.66 (56.94)
Organized Group	18.29 (69.80)	14.35 (60.92)	16.06 (64.92)
Informal Group	46.65 (86.81)	62.70 (108.30)	55.74 (99.82)
Activities of Daily Living	31.63 (73.76)	5.90 (32.68)	16.03 (54.25)
Walk/Wheel	21.01 (52.50)	18.32 (49.70)	19.49 (50.93)

Table 3a

Correlations between Positive Staff Engagement and Resident Engagement, Affect, and Activities – Participants from Control Facilities. (*P* values derived from random effects regression models are given in parentheses.)

Subject (# of Observations)	Resident Interest	Resident Pleasure	Organized Activity Participation	Informal Group Activity Participation	Activities of Daily Living (including Dining)	Resident Walking/Wheeling in Hallway
C1 (69)	.25 (.037)	.22 (.069)	.88 (< .001)	-.12 (.320)	-.04 (.734)	-.14 (.249)
C2 (86)	.51 (< .001)	.15 (.191)	N/A	.01 (.966)	.34 (.002)	.25 (.024)
C3 (73)	.25 (.026)	.06 (.615)	.50 (< .001)	.11 (.318)	.14 (.204)	.23 (.042)
C4 (86)	.36 (< .001)	.17 (.108)	.88 (< .001)	-.10 (.341)	-.07 (.507)	.30 (.004)
C5 (65)	.25 (.042)	.60 (< .001)	.89 (< .001)	-.10 (.402)	-.14 (.252)	.07 (.582)
C6 (68)	.39 (< .001)	.48 (< .001)	.13 (.287)	.03 (.836)	N/A	.43 (< .001)
All Controls	.33 (< .001)	.39 (.046)	.74 (.001)	-.03 (.548)	<.01 (.885)	.18 (.096)

Note: N/A means code did not occur for that resident so no correlation could be computed.

Table 3b

Correlations between Positive Staff Engagement and Resident Engagement, Affect, and Activities – Participants from Treatment Facilities. (*P* values derived from random effects regression models are given in parentheses.)

Subject (# of Observations)	Resident Interest	Resident Pleasure	Organized Activity Participation	Informal Group Activity Participation	ADL	Resident Walking/ Wheeling in Hallway
T1 (70)	.38 (< .001)	.53 (< .001)	.60 (< .001)	< .01 (.987)	.09 (.473)	.38 (< .001)
T2 (79)	.39 (< .001)	.47 (< .001)	.60 (< .001)	.01 (.920)	.23 (.037)	.33 (.002)
T3 (59)	.53 (< .001)	.55 (< .001)	.77 (< .001)	.06 (.653)	N/A	.04 (.738)
T4 (57)	.52 (< .001)	.56 (< .001)	.42 (.001)	.28 (.033)	.40 (.002)	.07 (.593)
T5 (64)	< .01 (.970)	.46 (< .001)	.93 (< .001)	.03 (.838)	N/A	-.05 (.661)
T6 (58)	.54 (< .001)	.66 (< .001)	.41 (.001)	.53 (< .001)	N/A	-.03 (.802)
T7 (32)	.82 (< .001)	.82 (< .001)	N/A	> .99 (< .001)	N/A	-.06 (.731)
T8 (52)	.29 (.035)	.19 (.165)	.56 (< .001)	.06 (.665)	N/A	.12 (.369)
T9 (53)	.41 (.002)	.15 (.263)	-.06 (.687)	.25 (.065)	N/A	.25 (.070)
T10 (54)	.65 (< .001)	.48 (< .001)	.55 (< .001)	.25 (.068)	N/A	.11 (.416)
All Treated	.44 (< .001)	.58 (< .001)	.62 (< .001)	.12 (.003)	.14 (< .001)	.16 (.055)
All Subjects	.39 (< .001)	.50 (< .001)	.69 (< .001)	.07 (.140)	.06 (.232)	.16 (.008)
p-value for Comparison Between Groups	.102	.141	.412	.821	.811	.859

Note: N/A means code did not occur for that resident so no correlation could be computed.

Table 4a

Correlations Between Resident Interest And Pleasure And Resident Activity Type – Control Group Participants (*p* values given in parentheses).

Subject-Correlate	Interest	Organized Group	Informal Group	ADL	Walk
C1 Interest	1	.247 (.038)	.427 (< .001)	.149 (.214)	.387 (< .001)
C1 Pleasure	.291 (.014)	.055 (.648)	.501 (< .001)	-.008 (.947)	.198 (.098)
C2 Interest	1	N/A	.139 (.218)	.461 (< .001)	.449 (< .001)
C2 Pleasure	.242 (.031)	N/A	.368 (< .001)	.177 (.117)	-.049 (.664)
C3 Interest	1	.112 (.279)	.444 (< .001)	.284 (.0103)	.219 (.0495)
C3 Pleasure	.276 (.013)	-.041 (.717)	.355 (.001)	-.045 (.691)	.077 (.496)
C4 Interest	1	.322 (.002)	.289 (.006)	.384 (< .001)	.154 (.153)
C4 Pleasure	.258 (.015)	.008 (.939)	.079 (.464)	.197 (.065)	.145 (.177)
C5 Interest	1	.129 (.297)	.234 (.057)	.390 (.001)	.461 (< .001)
C5 Pleasure	.239 (.052)	.300 (.014)	.067 (.588)	.058 (.641)	.262 (.033)
C6 Interest	1	.383 (.001)	.178 (.140)	N/A	.613 (< .001)
C6 Pleasure	.442 (< .001)	-.080 (.508)	.314 (.008)	N/A	.360 (.002)

Note: N/A means code did not occur for that resident so no correlation could be computed.

Table 4bCorrelations Between Resident Interest And Pleasure And Resident Activity Type – Treatment Group Participants (*p* values given in parentheses).

Subject-Correlate	Interest	Organized Group	Informal Group	ADL	Walk
T1 Interest	1	.200 (.090)	.264 (.024)	.376 (.001)	.246 (.036)
T1 Pleasure	.415 (< .001)	.200 (.090)	.170 (.149)	.299 (.0102)	.167 (.158)
T2 Interest	1	.218 (.049)	.495 (< .001)	.274 (.013)	.267 (.015)
T2 Pleasure	.462 (< .001)	.377 (< .001)	.191 (.085)	.107 (.337)	.159 (.153)
T3 Interest	1	.362 (.004)	.162 (.212)	N/A	.474 (< .001)
T3 Pleasure	.417 (< .001)	.248 (.054)	.424 (< .001)	N/A	-.010 (.937)
T4 Interest	1	.266 (.044)	.438 (< .001)	.203 (.126)	.278 (.035)
T4 Pleasure	.432 (< .001)	-.094 (.481)	.497 (< .001)	.081 (.547)	.018 (.896)
T5 Interest	1	-.158 (.201)	.321 (.008)	N/A	.827 (< .001)
T5 Pleasure	.329 (.007)	.358 (.003)	.366 (.002)	NA	.106 (.392)
T6 Interest	1	.255 (.049)	.419 (< .001)	N/A	.431 (< .001)
T6 Pleasure	.547 (< .001)	.756 (< .001)	.326 (.011)	N/A	-.005 (.972)
T7 Interest	1	NA	.810 (< .001)	N/A	.217 (.224)
T7 Pleasure	.574 (< .001)	NA	.850 (< .001)	N/A	-.051 (.778)
T8 Interest	1	.166 (.226)	.202 (.139)	N/A	.224 (.100)
T8 Pleasure	.339 (.011)	-.182 (.185)	.657 (< .001)	N/A	.172 (.210)
T9 Interest	1	.160 (.244)	-.034 (.803)	N/A	.711 (< .001)
T9 Pleasure	.193 (.159)	-.028 (.837)	.313 (.020)	N/A	-.076 (.581)
T10 Interest	1	.303 (.023)	.364 (.006)	N/A	.213 (.115)
T10 Pleasure	.384 (.004)	.170 (.210)	.497 (< .001)	N/A	-.037 (.789)

Note: N/A means code did not occur for that resident so no correlation could be computed.

Table 4c

Correlations Between Resident Interest And Pleasure And Resident Activity Type – Aggregated Across Participants And Group Comparisons (*p* values given in parentheses).

Group-Correlate	Interest	Organized Group	Informal Group	ADL	Walk
All Controls – Interest	1	.273 (< .001)	.321 (.021)	.267 (< .001)	.411 (< .001)
All Controls – Pleasure	.318 (.002)	.074 (.117)	.317 (.040)	.035 (.495)	.205 (< .001)
All Treated Subjects – Interest	1	.271 (.044)	.356 (.002)	.178 (< .001)	.375 (< .001)
All Treated Subjects – Pleasure	.435 (< .001)	.332 (.042)	.397 (.003)	.065 (.118)	.076 (.067)
All Subjects - Interest	1	.479 (.024)	.345 (< .001)	.223 (.492)	.388 (< .001)
All Subjects - Pleasure	.401 (< .001)	.288 (.024)	.363 (< .001)	.043 (.426)	.114 (< .001)
p-value for Comparison of Control vs. Treated - Interest	N/A	(< .001)	(< .001)	(.024)	(< .001)
p-value for Comparison of Control vs. Treated – Pleasure	(< .001)	(< .001)	(.033)	(< .001)	(< .001)

Note: N/A means code did not occur for that resident so no correlation could be computed.