



9-30-2021

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Recommended Citation

Ford, M.N., Bayles, M.W. & Bruzek, J.L. Assessing Preference and Stability of Preference for Individuals with Neurocognitive Disorder. *Behavior Analysis Practice* (2021). <https://doi.org/10.1007/s40617-021-00648-7>

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Assessing Preference and Stability of Preference for Individuals with Neurocognitive Disorder

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Author Note

This article is based on the master's thesis completed by the first author and supervised by the second author. We would like to express our gratitude to Dr. Paige McKerchar for feedback throughout this study. We also wish to acknowledge the much-appreciated efforts of Sara Posey Gaines, Alannah Knight, and Amanda Miles in assisting with data collection.

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Abstract

Poor engagement can lead to reduced quality of life for individuals with neurocognitive disorder (NCD). Research on determining preference and increasing engagement with this population is limited. The purpose of this study was to compare the accuracy of four preference assessment formats in identifying preferred activities and predicting engagement for six females with NCD and to measure the stability of preference and engagement over time. We compared the predictability of single stimulus (SS) verbal and multimedia assessments, caregiver rankings (CR), and multiple stimulus without replacement (MSWO) assessments. Participants responded consistently on SS assessments, but we noted inconsistencies between the CR and MSWO assessments. SS assessments predicted engagement during engagement analyses (EA), but rank-order assessments did not predict engagement in moderate-ranked activities. The rank-order assessments predicted engagement in high-ranked activities for most participants and in low-ranked activities two participants. We also evaluated the stability of preferences and engagement over time. Participants responded consistently on SS assessments and inconsistently on MSWO assessments across time. SS assessments consistently predicted engagement during EAs administered between 8 and 32 weeks for five participants, but when considering activity rank, the MSWO was inconsistent in predicting engagement across time for most participants. These results suggest SS assessments may be useful for identifying preferred activities and engagement, and preferences may remain stable for some individuals with NCD.

Keywords: aging, dementia, engagement, gerontology, preference assessment

Declarations

Funding: No funds, grants, or other support was received.

Availability of data and material: All data and material are available for review.

Code availability: All data are stored on GraphPad Prism and available for review.

Compliance with Ethical Standards: This research involved human participants. Approval for the research was obtained through a university IRB process. All participants and their legal guardians provided written consent to participate. This article has not been previously published and will not be submitted elsewhere during the review process.

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Assessing Preference and Stability of Preference for Individuals with Neurocognitive Disorder

Individuals with neurocognitive disorder (NCD) (5th ed.; *DSM–5*; American Psychiatric Association, 2013) often face behavioral difficulties, including limited ability to access reinforcers independently (Buchanan et al., 2008) and gradual disengagement with previously preferred activities (Logsdon & Teri, 1997). Researchers have found that poor engagement in this population can lead to the development of problematic symptoms such as reduced social interactions, cognitive decline, and other behaviors symptomatic of depression (Feliciano et al., 2009). Increasing engagement levels can reduce these unwanted outcomes (Engelman et al., 1999).

One way to increase engagement is to identify activities the individual prefers through preference assessments, which serve different purposes for different populations. Researchers working with individuals with intellectual and developmental disabilities have demonstrated the utility of preference assessments for identifying items that can be used to increase adaptive behaviors (Piazza et al., 2011). However, the purpose of preference assessments for people with NCD is to keep individuals engaged in meaningful activities (Wagner et al., 2020).

Research suggests that additional modalities, or “external supports”, such as visual and textual cues, are helpful in assisting adults with NCD to communicate more effectively (see Burshnic & Bourgeois, 2020). External supports are easy to use, cost-effective, and adaptable. Researchers have examined the use of different modalities (e.g., vocal, pictorial, tangible, and textual) and different preference assessment formats (e.g., single stimulus, paired stimulus, and multiple-stimulus without replacement) with people with NCD (e.g., LeBlanc et al., 2006; LeBlanc et al., 2008; Raetz et al., 2013). LeBlanc et al. (2006) examined the use of a paired-stimulus (PS) preference assessment using different modalities (i.e., vocal, pictorial, textual, and

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tangible), and found that the vocal modality resulted in the highest correlations between item ranking and subsequent engagement with the item for three of four participants with various stages of NCD. This assessment was administered by asking the individual which of two stimuli they preferred. Each stimulus was paired with every stimulus at least once until each stimulus had been paired with every stimulus (Fisher et al., 1992). One participant had the highest correlations using a tangible modality. This assessment was administered in the same way except the items were available during the assessment. Most participants' engagement levels increased when they were provided with choices of preferred items and activities. The researchers demonstrated that different modalities of PS preference assessments might influence responding for individuals with NCD, but that the vocal modality was most effective for the majority of participants.

Furthering previous research, LeBlanc et al. (2008) examined the predictive validity of the multimedia and verbal versions of the Pleasant Events Schedule-Alzheimer's Disease (PES-AD) to identify preferred items in adults with NCD and verified each assessment with subsequent engagement analyses. They found that both versions of the PES-AD identified preferred items for each participant, with the highest predictive validity attributed to items endorsed on both assessments. However, when individuals with mild to moderate NCD endorsed items only on the verbal version, the assessment tended to produce false positives. The multimedia assessment, when used independently, was best suited for identifying preferred items for individuals with mild to moderate NCD. Using both versions was the most effective method for individuals with more progressive NCD. One limitation of this study was that the verbal assessment was always conducted before the multimedia assessment, which could have resulted in a greater number of preferred items identified when using the multimedia assessment.

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To determine if the MSWO procedures would be useful for adults with NCD, Raetz et al. (2013) evaluated the validity of a three-array and one-array MSWO preference assessment procedure to predict preferred items and the stability of preferences over time for seven individuals with NCD. They found that the MSWO procedure successfully predicted engagement for five of seven participants and that the one- and three-array rankings were equally predictive of engagement. Their results also indicated that, for four out of five participants, preferences remained stable across assessments ranging from 3.5 to 5 months. These findings are valuable because they showed a single-array presentation is effective and might be more appropriate for this population given their likelihood of fatigue. Though the MSWO was relatively predictive of overall engagement, engagement analyses did not confirm a hierarchical preference for each item. Further, Raetz et al. did not include all items from the preference assessments in the subsequent engagement analyses; only moderate- to high-ranked items and one non-endorsed item were included. Because of this, participants' lack of preference for all items deemed "nonpreferred" during the preference assessment was unable to be validated by the engagement analyses.

Our primary goal was to extend previous research by directly comparing SS assessments to rank-order assessments to evaluate the consistency and predictive validity, and, later, to include all stimuli from the preference assessments in the subsequent engagement analyses to validate hierarchical preference. We evaluated two modalities of the SS assessment to determine if the way the preference assessment was conducted (i.e., with verbal vs. pictorial and text prompts) would produce differences in responding. We also compared a CR assessment to an MSWO assessment to determine if there was consistency in preference rankings across these two rank-order assessments. We included this evaluation because the CR assessment is quick

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and easy and could be an alternative to the MSWO if it produced similar results. We addressed some of the limitations of previous research by varying the order in which the different preference assessments were administered (LeBlanc et al. 2008) and by including social activities as stimuli (e.g., Scattegories, Farkle, Horseshoes, LCR Left Center Right Dice Game, and Bingo). Therefore, the purpose of this study was to compare the accuracy of four different preference assessment procedures, a CR assessment, two SS preference assessments (SS verbal and SS multimedia), and an MSWO preference assessment, in identifying preferred activities and predicting engagement for individuals with NCD. Our secondary goal was to measure the stability of preference and engagement over time.

Method

Participants and Setting

Six female adults aged 72 to 94 years participated in this study. All participants were residents of a memory-care unit at a local assisted-living facility. All participants had a diagnosis of NCD (See Table 1 for specific participant information). Consent and assent were obtained from the participants and their caregivers prior to beginning the study.

All sessions were conducted in the common living area within the memory-care unit. The common area contained several tables and chairs, couches, a television, and data collection and activity materials. The SS verbal preference assessment lasted an average of 2.7 min (range, 1-10 min), the SS multimedia assessment lasted an average of 2.45 min (range, 1-5 min), and the MSWO assessment lasted an average of 4.05 min (range, 1-9 min). The subsequent engagement analyses were 5 min.

Procedure

Preference Assessment

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Each of the three assessments (SS verbal, SS multimedia, and MSWO) was conducted a minimum of 24 hr apart and no longer than seven days apart. Subsequent administrations of each assessment were approximately four weeks following the initial administration for six participants, eight weeks following the initial administration for five participants, and additional administrations at 20 weeks for two participants and 32 weeks for one participant (see Table 1). Prior to conducting the preference assessments, the activity coordinator at the assisted-living facility ranked a list of 13 activities commonly offered at the facility from most to least preferred for each participant. Three highly preferred, three moderately preferred, and three low preferred activities, identified by the activity coordinator, were used during the preference assessments. The order in which the preference assessments were administered varied within and across participants. The researcher sat facing the participant for all preference assessment sessions. The procedures used for the SS assessments were similar to the procedures described by LeBlanc et al. (2008). To begin the SS assessments, the researcher stated, "I am going to read you a list of activities that are sometimes available here. Say 'yes' if you enjoy the activity or 'no' if you do not enjoy the activity," and then waited approximately 20-30 s for an answer. If the participant provided an answer other than yes or no, the question was asked again. If a yes or no answer was not provided by the participant within 20-30 s on the second attempt, then the researcher moved on to the next question. If the participant asked what an activity was (e.g., "How do you play that?"), the researcher provided the participant with a brief verbal description of the activity. In addition, the researcher provided attention throughout each assessment in the form of neutral statements (e.g., "You look nice today.").

SS verbal. During the SS verbal assessment, the researcher was seated across from the participant with a clipboard and paper that included a list of activities. The list of activities was

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not visible to the participant. The researcher asked the participant if she enjoyed each of the activities on the list.

SS multimedia. For the SS multimedia assessment, the researcher was seated behind the screen of an iPad placed on a table or in the researcher's hands directly in front of the participant. The iPad contained multimedia stimuli in the form of a Microsoft PowerPoint presentation containing both the question, in 36-point Tahoma font text, and a picture of the activity. After reading each question aloud to the participant, the researcher pointed to the iPad screen (LeBlanc et al., 2008).

MSWO. When conducting the MSWO assessment, the researcher randomly arranged an array of nine cards depicting activities identified by the activity coordinator as high, moderate, or low preferred by the participant. Each card contained a photo of one activity and the written name of the activity. The cards were created using the format from the SS multimedia PowerPoint slides. The researcher stated the name of each activity as the cards were placed in an array of two equally spaced lines. The researcher stated to the participant, "Today I brought cards with pictures of some of the activities that you do here. I am going to lay the cards out in front of you and ask you to choose your most preferred/favorite activity out of all the cards. Then, after you choose one, I will take that card away and ask you to pick your next favorite activity out of the remaining cards. We will keep doing this until there are no cards or until there are not any activities left that you enjoy." After the participant selected a card, it was removed from the array, and the researcher filled in any gaps in the array without rearranging the cards. When five cards remained, the array was presented in a single line. This process continued until there were no cards remaining or until the participant chose not to make a selection. If a participant did not make a selection within 20-30 s, the researcher repeated the instructions. No

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participant required more than three additional verbal prompts to complete the assessment.

Noncontingent attention was delivered similar to the SS assessments. The MSWO procedure was similar to the procedure used in Daly et al. (2009) in that participants did not receive access to activities following a selection from the array.

Engagement Analysis

We began conducting engagement analyses no longer than 24 hr after all preference assessments were administered. To begin each session, the researcher asked the participant if she wanted to engage in an activity. If the participant agreed, then the researcher began taking engagement data at the start of the activity using 5-s whole-interval recording. Experimenter, staff, and peer attention were delivered non-contingently during engagement analyses because most of the activities required social interaction. Either the activity coordinator or a researcher led all activities during the analyses. If the participant requested to leave or left the area at any point, materials remained available for the remainder of the session, and intervals were scored as unengaged unless the participant returned to the activity. Participants were provided with two opportunities to participate in each activity. If a participant declined once, the researcher asked again at a later time or date. If a participant declined an activity twice, it was recorded as declined and the participant was not asked to engage in the activity again during that administration of the assessment. There was a minimum of 5 min between each session during the engagement analysis or 5 min in between an activity being declined and another activity being offered. If a participant declined three consecutively offered activities, the engagement analyses did not resume for at least 24 hr following the last decline. Engagement analyses followed each administration of the preference assessments across time.

Response Measurement and Interobserver Agreement

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For the SS verbal and SS multimedia preference assessments, the researcher and another observer recorded yes/no responses with pen and paper for each question in the assessment. A selection on the SS verbal and SS multimedia preference assessments was defined as a consistent preference if the participant provided the same answer, either yes or no, about an activity on both assessments. For the MSWO assessment, the researcher and another observer recorded names of the activity selected in rank order for each trial and noted the corresponding positions of the card as one of the following, “Top Left,” “Top Middle,” “Top Right,” “Bottom Left,” “Bottom Middle,” “Bottom Right,” “Left,” “Middle,” “Right.” Consistencies across the CR and MSWO assessments were defined as correspondences between the top three activities (i.e., ranking of 1-3), middle three activities (i.e., ranking of 4-6), and bottom three activities (i.e., ranking of 7-9). Stability of preference for the SS and MSWO preference assessments was defined as correspondence between answers about an activity on three of four subsequent assessments for Delores, Mabel, and Ellen, on two of three subsequent assessments for Joyce and Winifred, and on two of two assessments for Meredith.

For the SS assessments, if both observers recorded either yes or no for the same question, it was considered an agreement. It was considered a disagreement if one observer recorded yes and the other recorded no for the same question or vice versa. Stability of preference for the SS assessments was defined as correspondence between yes and no answers for three of four subsequent assessments for Delores, Mabel, and Ellen, on two of three subsequent assessments for Joyce and Winifred, and on two of two assessments for Meredith. Interobserver agreement (IOA) was calculated by dividing the number of trials with agreements by the number of trials with agreements plus disagreements then multiplying by 100%. For the MSWO assessment, both observers recorded all selections made by the participant. Interobserver agreement was

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calculated by dividing the number of trials with agreements by the number of trials with agreements plus disagreements then multiplying by 100%. IOA was collected for 33% of sessions for each type of preference assessment for Joyce and Winifred and for 50% of the sessions for Delores, Ellen, Mabel, and Meredith. This resulted in a mean interobserver agreement of 100% for the SS verbal and SS multimedia assessments and 100% for the MSWO assessment for all participants.

For the engagement analysis, observers collected data on engagement in activities using 5-s whole-interval recording for 60 consecutive intervals. The criterion for scoring an interval as engaged was the participant orienting towards and/or touching the activity materials for 5 s within an entire 5-s interval. Engagement in duration of less than 5 s was not scored. The results for the SS assessments were considered valid if a yes response resulted in any level of engagement and if a no response resulted in zero levels of engagement. The results from rank-order assessments were considered valid if a participant engaged in high-ranked activities for 61% to 100% of intervals, in moderate-ranked activities for 31-60% of intervals, and in low-ranked activities for 0-30% of intervals.

An agreement was scored if both observers scored or did not score the same intervals. A disagreement was scored if one observer scored an interval and the other observer did not score the interval. The number of agreements was divided by the number of agreements plus disagreements and multiplied by 100%. IOA was collected for 33.3% of engagement analysis sessions for Delores, Mabel, Meredith, 38.9% of the sessions for Ellen, 40.7% of sessions for Joyce, and 48.2% of sessions for Winifred. This resulted in a mean IOA for the engagement analysis of 99.9% for Delores (range, 98.3% to 100%), 99.6% for Joyce (range, 95% to 100%),

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98.8% for Ellen (range, 86.6% to 100%), 98% for Winifred (range, 88.3% to 100%), 97.9% for Mabel (range, 88.3% to 100%), and 96.9% for Meredith (range, 81.6% to 100%).

Results

The first column of Figure 1 depicts consistencies across the first administration of the SS verbal and multimedia preference assessments. Figure 1 includes representative data for Joyce (top panel), Winifred (middle panel), and Meredith (bottom panel). Preferences were consistent for all nine activities during the SS assessments during the first administration for Joyce, Meredith, Ellen (not illustrated), and Delores (not illustrated). Winifred's results were consistent for six of nine activities and Mabel's (not illustrated) for eight of nine activities.

The second column of Figure 1 displays representative data illustrating consistencies across the MSWO and CR assessments. Joyce's CR and MSWO assessments were consistent for one of three of each high-, moderate-, and low-ranked activities. Winifred's, Mabel's (not illustrated), and Ellen's (not illustrated) CR and MSWO assessments were consistent for two of three high- and low-ranked (one of three low-ranked for Mabel and Ellen) and for one of three moderate-ranked activities. Meredith's and Delores' CR and MSWO were consistent for one of three high-ranked stimuli and for 0 of three moderate- (one of three for Meredith) and low-ranked activities.

Figures 2-4 and Table 2 depict the results for stability of preference over time for the SS assessments. Figure 2 depicts the results for Delores (top panel), Mabel (middle panel), and Ellen (bottom panel). Each of these participants participated in four administrations of the preference assessments. Figure 3 depicts the results for stability of preference across time for the SS assessments for Joyce (top panel; three administrations), Winifred (middle panel; three administrations), and Meredith (bottom panel; two administrations).

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Delores' and Joyce's preferences remained stable for all nine activities on both SS assessments across all administrations. Mabel's and Ellen's preferences remained stable for eight of nine activities on both SS assessments. For Winifred, preferences remained stable for eight of nine activities on the SS verbal assessment and seven of nine activities on the SS multimedia assessment. Meredith was relocated to a different facility and was not able to complete the study. Her preferences were stable for seven of nine activities on the SS verbal assessment and for eight of nine activities on the SS multimedia assessment during the only subsequent administration of the preference assessments.

Figure 4 depicts representative data for the stability of preference across time during four MSWO administrations for Delores (top panel), Mabel (middle panel), and Ellen (bottom panel). Joyce and Winifred (not illustrated) experienced three MSWO administrations, and Meredith (not illustrated) experienced two MSWO administrations. For Delores (top panel), five of nine activities (two high, one moderate, and two low preferred) remained in the same rank level across at least three of four administrations. The results for participants not illustrated, Joyce (six of nine activities; two high, moderate, and low preferred), Winifred (seven of nine activities; three high and low and one moderate preferred), and Meredith (four of nine activities; one high and low and two moderate preferred), the results were similar across fewer MSWO administrations. For Mabel, only three of nine activities (two high and one low preferred) remained stable. For Ellen, all nine activities remained stable.

Table 2 displays the number of consistencies across preference assessments for all participants. For five of six participants, most stimuli were endorsed on both SS assessments; however, there were discrepancies for all participants except Delores, who endorsed all nine stimuli on both SS assessments. The SS assessments showed more consistencies for all

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participants than the rank-order assessments. There were very few consistencies between the CR and MSWO assessments for all participants. The most consistencies occurred with high-ranked stimuli and the fewest consistencies were across moderate-ranked stimuli. These results suggest that both versions of the SS assessments might yield similar results when predicting engagement in activities. In contrast, the rank-order assessments yielded vastly different results and likely will not be equally predictive of engagement.

Figure 5 depicts representative engagement analysis results across all four administrations of the engagement analysis for Delores (top panel), Mabel (middle panel), and Ellen (bottom panel). The results of the engagement analysis were used to validate the rank-order and SS assessments, and to determine stability of engagement over time with and without the consideration of ranking.

Rank-Order Assessment Validation

During the first engagement analysis, Delores engaged in all nine activities for 100% of intervals observed, which validated the results of both rank-order assessments for high-ranked activities (MSWO and CR, Farkle; MSWO, reading and word search; CR, sitting outside and paddle balloon). For both of Mabel's rank-order assessments, all three high-ranked activities (MSWO, reading, sitting outside and watching tv; CR, sitting outside, watching tv, and coloring) were validated across both rank-order assessments. The CR assessment predicted engagement in two of three low-ranked activities (Farkle and word search), and the MSWO predicted engagement in one of three low-ranked activities (Farkle). Ellen's CR assessment predicted engagement in all three high-ranked activities (watching tv, Farkle, and Bingo) and low-ranked activities (word search, coloring, and reading). Her MSWO predicted engagement in all three high-ranked activities (Farkle, LRC, Bingo) and two of three low-ranked activities (coloring and

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reading). For the participants not illustrated, Joyce, Winifred, and Meredith, the results were similar in that the rank-order assessments were more likely to predict engagement for high-ranked activities. For Joyce's CR assessment, all three high-ranked activities and one of three low-ranked activities were validated. The MSWO predicted engagement in two of three high-ranked activities. Winifred engaged in three activities for 100% of intervals observed, in one for 60% of intervals, and in one for 38.3% of intervals. She declined four activities. For both rank-order assessments, one of three high-ranked activities was validated. The CR predicted engagement in one of three low-ranked activities. The MSWO predicted engagement in one of three moderate-ranked activities and for two of three low-ranked activities. Meredith engaged in six activities for 100% of intervals observed, in one for 90% of intervals, and in one for 78.3% of intervals. She declined one activity. For both rank-order assessments, all three high-ranked activities were validated. The CR assessment predicted engagement in one of three low-ranked activities.

SS Assessment Validation

Delores's first engagement analysis validated the results of both SS assessments. Mabel engaged in six activities for 100% of intervals observed, in one activity for 65% of intervals, and in one activity for 28.3% of intervals. She declined one activity. These results validated the SS verbal assessment for seven of nine activities and SS multimedia for eight of nine activities. Ellen engaged in four activities for 100% of intervals observed, in one activity for 90% of intervals, and in one activity for 66.7% of intervals. She declined three activities. These results validated both SS assessments for all nine activities. For the participants not illustrated, Meredith, Joyce, and Winifred, the results were similar to those observed with the other participants. For Meredith the initial engagement analysis validated the SS verbal and

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multimedia assessments for eight of nine activities, and for Joyce, the initial engagement analysis validated the SS verbal and multimedia assessment for seven of nine activities.

Winifred's initial engagement analysis validated the SS verbal assessment for eight of nine activities and validated the SS multimedia assessment for seven of nine activities.

Stability of Engagement per MSWO Ranking

Engagement with activities was also compared across all four assessment administrations for all participants. The results of the stability of engagement across time indicate that engagement levels were unstable for all but one participant. For Delores, only one of nine activities (Farkle) produced stable patterns of preference with subsequently stable engagement. Engagement remained stable for one of two consistently high-ranked activities. For Mabel, only two of nine activities (reading and paddle balloon) produced stable patterns of preference with subsequently stable engagement. Engagement remained stable for two of two consistently high-ranked activities. For Ellen, six of nine activities (Farkle, LRC, Bingo, word search, coloring, and reading) produced stable patterns of preference with subsequently stable engagement. Engagement remained stable for all three consistently high-ranked activities and for three of four consistently low-ranked activities. For Winifred (not illustrated), two of nine activities produced stable patterns of preference with subsequently stable engagement. Engagement remained stable for one of three consistently high-ranked activities, and for one of three consistently low-ranked activities. For Joyce (not illustrated), there were no activities that produced stable patterns of preference with subsequently stable engagement. Meredith (not illustrated) only received two administrations of engagement analyses and one of nine activities produced stable patterns of preference with subsequently stable engagement. Engagement remained stable for the one consistently high-ranked activity during both engagement analysis administrations.

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For Delores, Mabel, Meredith, Joyce, Winifred, and Meredith, engagement levels consistent with activity rank remained relatively unstable for most activities. For Ellen, engagement levels consistent with activity rank remained relatively stable for most activities. Although preference patterns were stable for most participants, levels of subsequent engagement in activities were not stable, when considering activity rank, across administrations for the majority of participants. We found that most participants often engaged in low-ranked activities at high levels and one participant, Winifred, engaged in high-ranked activities at low levels.

Table 3 summarizes the predictive validity of each administration of preference assessment for each participant. The SS verbal and multimedia assessments accurately predicted engagement in the majority activities for all participants. Also, the SS multimedia predicted engagement with the same number of stimuli as the SS verbal and, in a few instances, predicted engagement in more activities. The CR assessment successfully predicted engagement in high-ranked activities for most, whereas moderate- and low-ranked activities were not validated by the engagement analyses, except for Ellen and Winifred, for which low-ranked activities were validated. The MSWO assessment successfully predicted engagement in the majority of high-ranked activities for Mabel, Ellen, and Joyce, for half of the administrations for Delores and Meredith, and for no administrations for Winifred. Levels of engagement for moderate- and low-ranked activities were not validated by the engagement analyses for the majority of participants. However, for Ellen and Winifred, low-ranked activities were validated for most activities. Overall, the SS multimedia assessment was the most predictive of engagement in activities, followed almost equally by the SS verbal assessment. Both the CR and MSWO assessments were predictive of engagement with the majority of high-preferred activities for half of the

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participants across multiple administrations but did not produce ranks indicative of future engagement in moderate- or low-preferred activities for the majority of participants.

Stability of Engagement Independent of Ranking

The results of the stability of engagement across time, when considering activity rank, indicate that engagement levels were unstable for all but one participant. However, when evaluating the stability of engagement without considering activity rank, overall engagement remained at stable levels, 61% to 100%, 31% to 60%, or 0 to 30%, for the majority of activities for most participants. Delores engaged with all nine activities at stable levels across at least three of four administrations. Mabel's engagement levels remained stable for six of nine activities for at least three of four administrations. Ellen's engagement levels remained stable for eight of nine activities for at least three of four administrations. Joyce's and Winifred's engagement levels remained stable for eight of nine activities for at least two of three administrations without considering activity rank. Meredith's engagement levels remained stable for six of nine activities for two of two administrations without considering activity rank. These results suggest that most participants actively participate in most activities.

Overall, when evaluating these preference assessments, there were more consistencies between the two SS assessments than between the two rank-order assessments. In addition, the SS assessments were more predictive of engagement than the rank-order assessments. The rank-order assessments were fairly predictive of engagement with high-preferred activities but did not produce a rank order predictive of engagement with low- or moderate-preferred activities for most participants.

We found that preferences remained relatively stable on both SS assessments for all participants and remained stable on the MSWO assessments for Delores, Ellen, Joyce, and

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Winifred. Preferences on the MSWO assessment were not stable for Mabel and Meredith. When evaluating the stability of engagement across time, we found engagement levels remained relatively unstable with respect to preference rank order for most activities for two of three participants who received four administrations of the preference assessments and engagement analysis. For the two participants who completed three administrations and the one participant who completed two administrations, engagement levels were not stable with respect to the preference rank order for most activities. For example, if an activity was ranked high on most administrations, yet produced moderate or low levels of engagement during the majority of engagement analyses, it was considered unstable. Overall levels for engagement, without considering activity rank, were stable for the majority of activities across administrations for all participants. Although the SS assessments were predictive of engagement in general, the levels of engagement for each activity varied across administrations. However, the rank-order assessments failed to predict a hierarchy of engagement for moderate- and low-ranked activities for the majority of participants.

Discussion

The goal of our study was to elaborate on previous research and further examine the methods for assessing preferences of individuals with NCD. We administered four different preference assessments and compared them for consistency. Similar to the results obtained by LeBlanc et al. (2008), we found that the SS verbal and SS multimedia assessments produced more consistencies across the majority of activities for all participants, whereas the MSWO assessment and the CR assessments produced relative inconsistencies. As suggested by Burshnic and Bourgeois (2020), we found that individuals with NCD could participate in preference assessments, but may benefit from the use of more supportive formats (e.g., pictures and texts). Furthermore, the SS assessments were, on average, quicker to administer than the MSWO

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assessment and required little prerequisite training. Whereas, researchers have demonstrated that individuals without experience may inaccurately implement MSWO assessments (Roscoe & Fisher, 2008). Based on these results, it may be more beneficial to train caregivers how to administer SS preference assessments, rather than CR or MSWO assessments, for individuals with NCD.

When assessing the predictive validity of the SS assessments, we found that there were only slight differences between the two assessments. LeBlanc et al. (2008) found that SS assessments often produced false positives if items were not endorsed on both the PES-AD verbal and multimedia assessments, meaning that the individual reportedly preferred the item on one of the assessments but did not engage during the engagement analysis. We found that endorsement on both SS assessments did not eliminate the occurrence of false positives in comparison to activities endorsed on only one version of our SS assessments. The SS multimedia and the SS verbal assessments predicted engagement with equivalent amounts of activities for four participants. However, the SS multimedia accurately predicted one more activity than the SS verbal for two participants and took slightly less time to conduct on average. We also compared the predictive validity of the MSWO and CR assessments and found that both assessments successfully predicted engagement with the majority of high-ranked activities for most participants and with low-ranked activities for only two participants. Neither rank-order assessment predicted engagement with moderate-ranked activities. To date, little research has directly compared SS to rank-order assessments with this population. Our results showed the SS assessments accurately predicted engagement for most participants. The MSWO and CR assessments failed to predict a hierarchy of engagement levels. These results are comparable to Raetz et al. (2013), who reported that the MSWO successfully predicted levels of engagement

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with high-preferred items that were greater than engagement levels with low-preferred items for five of seven participants, but hierarchical preferences were not confirmed for two participants. However, we used a slightly more stringent criterion to assess engagement levels to determine the predictive validity of the MSWO. Raetz et al. (2013) defined levels of engagement relative to other levels (e.g., high-ranked items produced equal or higher levels of engagement than low-ranked items on 75% of engagement analyses). We specified percentage levels that corresponded with high, moderate, and low engagement. The more stringent criteria did not affect the results of the predictive validity of either assessment. Additionally, the MSWO assessment took the longest time to conduct and required training prior to administration. These results suggest that SS assessments can be used by staff at assisted-living facilities to quickly and accurately assess preference for individuals with NCD. The activities identified using these assessments can then be used to increase engagement if preferred activities are offered to participants.

Most participants participated in most activities; however, several factors, including time from the initial administration, medical issues, and peer influence, might have contributed to engagement levels. For example, Mabel's engagement remained stable for six of nine activities for at least three of four administrations without considering activity rank. However, Mabel exhibited an overall decrease in engagement during the third administration. We noted that her decreased engagement was correlated with a preferred peer's decrease in engagement; however, correlational data between engagement with activities and the peer's absence or presence were not collected. Another possible explanation is that Mabel was temporarily sent to a different facility for a medical evaluation where medication changes likely occurred. The fourth administration of assessments followed her return to the facility, and engagement levels

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increased similar to those observed during the first and second administrations. In addition, Joyce's engagement remained stable for eight of nine activities for at least two of three administrations without considering activity rank. Joyce exhibited a decrease in engagement levels for five of nine activities during the second administration. These changes in engagement might be attributed to limited mobility due to an injury she incurred during the time between administrations. It should also be noted that Joyce had limited access to her private room at this time, due to medical and safety concerns, and frequently left the common area during engagement analyses to visit her room when access was available.

We evaluated the stability of preference across time for all participants. Visual inspection showed that preferences were stable for Delores, Ellen, Joyce, and Winifred for most activities and unstable for Meredith and Mabel. These findings are consistent with Raetz et al. (2013), who also evaluated stability of preference with this population, and found that preference patterns were stable for the majority of participants and identified individual preference patterns for each participant. It should be noted that Raetz et al. examined stability across between eight and 10 administrations whereas we only examined stability across four assessment administrations.

There are a few potential limitations to note. First, because we evaluated preferred activities in our assessments, the engagement analyses were delayed until all three assessments were completed instead of allowing engagement following each selection. It is possible that motivating operations fluctuated from one session to the next. For example, if a participant selected Farkle as the number one choice on the MSWO assessment, then was not asked to play Farkle until four days later during the engagement analysis, the establishing operation for playing Farkle may have changed. Researchers should consider conducting preference

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assessments immediately preceding the engagement analysis or reinforcer assessment to reduce the likelihood that fluctuations in motivation will affect responding.

Second, there is a potential of selection bias; individuals that did not leave their private rooms could not participate in our study because sessions were only conducted in the common area of the facility. Future researchers could seek permission to incorporate items or activities that can be accessed in private rooms with only one or two peers present. This might increase the likelihood that other participants could participate; however, this option might require additional involvement from facility staff to oversee sessions conducted outside of the common area.

A third limitation of our study is that sessions were conducted based on experimenter and participant availability; therefore, sessions were not conducted at consistent times every day. A more consistent schedule would reduce the likelihood that changes in preference or engagement were due to time-related environmental factors, such as fatigue experienced later versus earlier in the day. It should also be noted that experimenter, staff, and peer attention was delivered non-contingently during engagement analyses because most of the activities required social interaction. Either the activity coordinator or a researcher directed all activities during the analyses. Therefore, it was not possible to evaluate activity engagement separate from the delivery of staff or experimenter attention. It is possible that noncontingent attention was responsible for the level of activity engagement. However, verbal interactions should not be completely eliminated when evaluating social activities because memory and other cognitive and physical impairments are common deficits in this population.

Fourth, it should be noted that the CR assessment was only administered once. The initial caregiver rank was then compared to the MSWO rank across several administrations, which were mostly inconsistent. It is possible that the caregiver rank could have changed across time

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based on the further observation of participants. It is also possible that the caregiver would have eliminated items provided for the rank order, similar to participants eliminating items on the MSWO assessments, if the option was available. Future researchers might examine whether caregiver rankings change across time by administering more frequent assessments.

Finally, the MSWO assessments were evaluated for stability across four administrations. Other studies included more administrations in their analysis of stability. Future researchers should evaluate responding across varying amounts of time by administering more frequent assessments across a longer period of time (e.g., administer assessments every two weeks across 24 weeks).

Worldwide, the number of individuals living with NCD continues to grow each year (World Health Organization, 2016). Because this population is rapidly increasing, behavior analysts should continue to investigate the best methods for identifying preferred items to increase engagement, and, thus, quality of life.

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EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Table 1*Participant Demographics*

Participant	Age	Sex	Ethnicity	Administrations	Weeks
Delores	86	Female	Caucasian	4	4, 8, and 20
Mabel	86	Female	Caucasian	4	4, 8, and 20
Ellen	83	Female	Caucasian	4	4, 8, and 32
Joyce	94	Female	Caucasian	3	4 and 8
Winifred	72	Female	African American	3	4 and 8
Meredith	82	Female	Caucasian	2	4

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Table 2*Consistencies Between Assessments*

Preference		Single Stimulus (Consistent)	Rank Order (Inconsistent)		
Participant	Admin.	SS Verbal vs. SS Multimedia	Caregiver Rank vs. MSWO Rank		
			High	Moderate	Low
Delores	1	9/9	1/3	0/3	0/3
	2	9/9	2/3	2/3	1/3
	3	9/9	2/3	1/3	1/3
	4	9/9	2/3	2/3	1/3
Mabel	1	8/9	2/3	1/3	1/3
	2	7/9	1/3	0/3	1/3
	3	7/9	1/3	1/3	1/3*
	4	7/9	0/3	0/3	1/3
Ellen	1	9/9	2/3	1/3	2/3*
	2	9/9	1/3	0/3*	2/3*
	3	9/9	3/3	2/3*	3/3*
	4	8/9	2/3	1/3*	3/3*
Joyce	1	9/9	1/3	1/3	1/3
	2	8/9	2/3	1/3	1/3
	3	7/9	1/3	1/3	2/3
Winifred	1	6/9	2/3	1/3	2/3
	2	4/9	2/3	1/3	1/3
	3	4/9	1/3	1/3	2/3*
Meredith	1	9/9	1/3	1/3	0/3
	2	6/9	3/3	2/3	2/3*

Note. * Denotes activity eliminated by participant. CR assessment was only administered once.

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

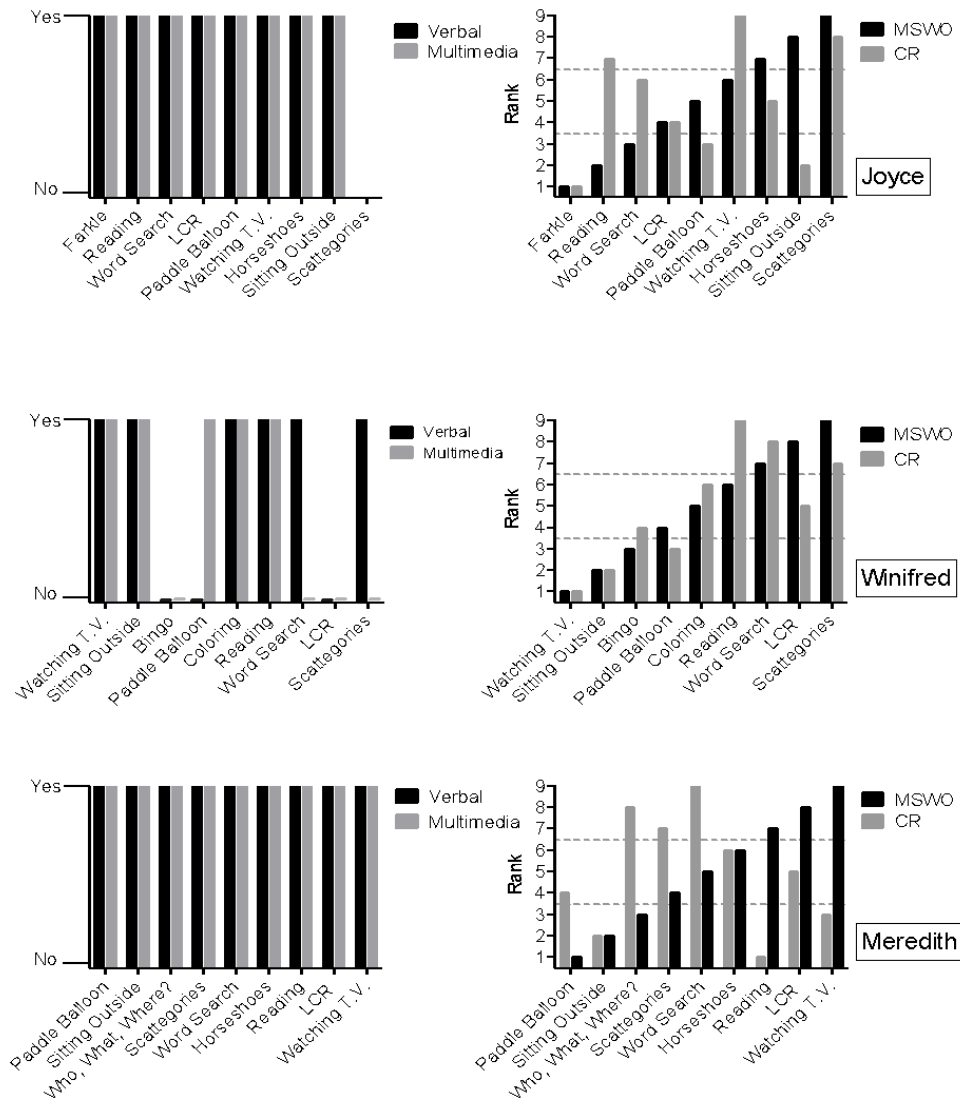
Table 3*Predictive Validity of Engagement in Activities*

Participant	Admin.	Verbal	Multimedia	Caregiver Rank			MSWO Rank		
				High	Moderate	Low	High	Moderate	Low
Delores	1	9/9	9/9	3/3	0/3	0/3	3/3	0/3	0/3
	2	7/9	7/9	2/3	0/3	1/3	2/3	0/3	0/3
	3	7/9	7/9	2/3	0/3	1/3	1/3	0/3	0/3
	4	6/9	6/9	2/3	0/3	2/3	1/3	0/3	0/3
Mabel	1	7/9	8/9	2/3	0/3	2/3	2/3	0/3	1/3
	2	8/9	8/9	2/3	0/3	1/3	3/3	1/3	1/3
	3	2/9	2/9	0/3	0/3	0/3	1/3	0/3	3/3
	4	6/9	8/9	2/3	0/3	0/3	3/3	0/3	0/3
Ellen	1	9/9	9/9	3/3	0/3	2/3	3/3	1/3	2/3
	2	9/9	9/9	3/3	0/3	3/3	3/3	1/3	2/3
	3	8/9	8/9	2/3	0/3	3/3	2/3	0/3	3/3
	4	7/9	8/9	2/3	1/3	3/3	3/3	1/3	3/3
Joyce	1	8/9	7/9	3/3	0/3	1/3	2/3	0/3	0/3
	2	7/9	6/9	1/3	0/3	2/3	1/3	0/3	1/3
	3	8/9	8/9	3/3	0/3	1/3	2/3	0/3	0/3
Winifred	1	8/9	7/9	1/3	0/3	1/3	1/3	0/3	2/3
	2	4/9	5/9	2/3	0/3	2/3	1/3	0/3	1/3
	3	6/9	3/9	1/3	0/3	2/3	1/3	0/3	3/3
Meredith	1	8/9	8/9	3/3	0/3	1/3	3/3	0/3	0/3
	2	7/9	8/9	1/3	0/3	0/3	1/3	0/3	0/3

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Figure 1

Initial Administration of SS verbal, SS Multimedia, MSWO, and CR Assessments

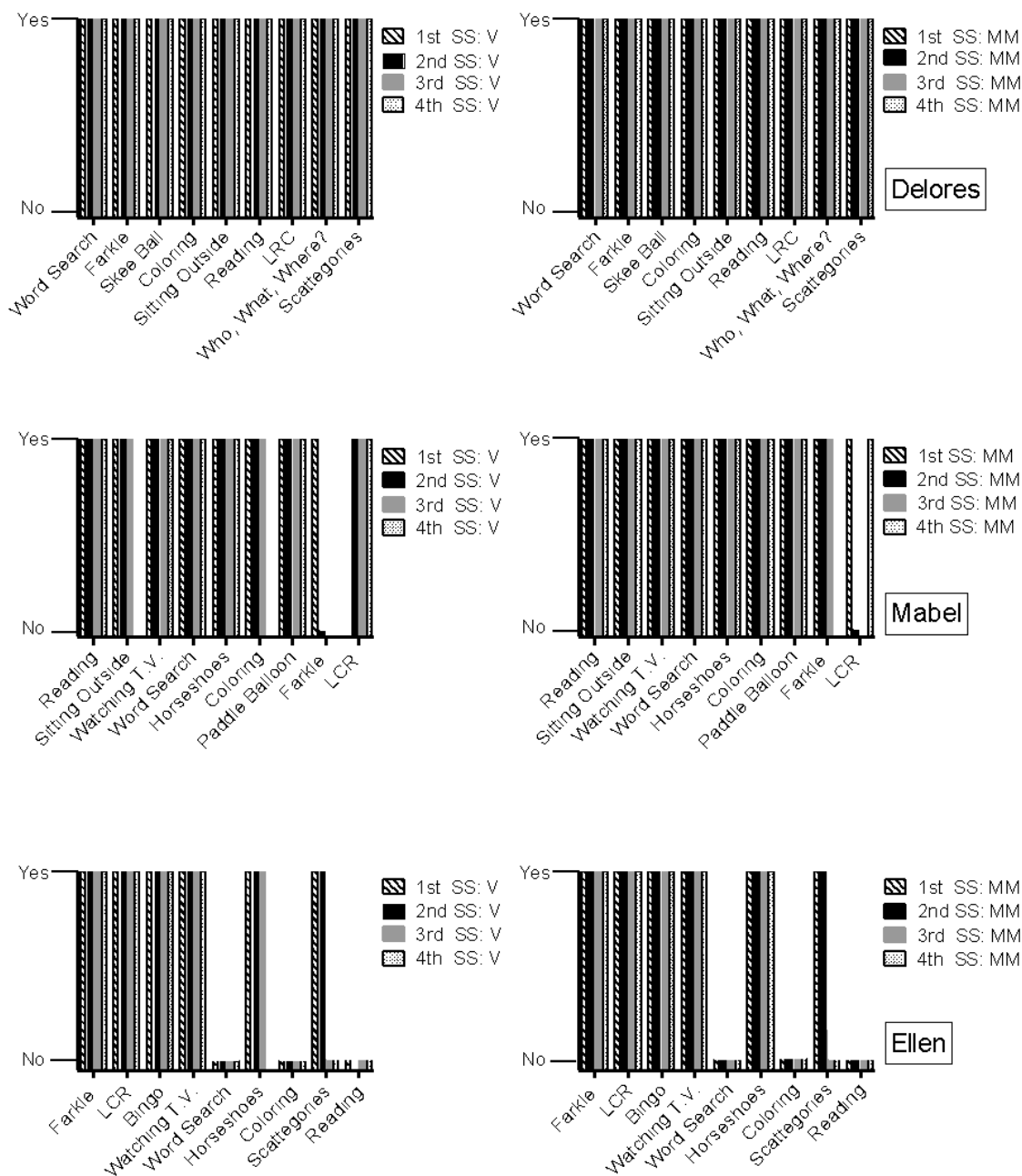


Note. Consistencies between the SS verbal and SS multimedia assessments and between the MSWO assessment and CR assessment during the initial administration. No bar denotes that the item was not selected in the MSWO assessment or an answer other than yes or no was given during the SS assessments.

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Figure 2

SS Verbal and SS Multimedia Assessments

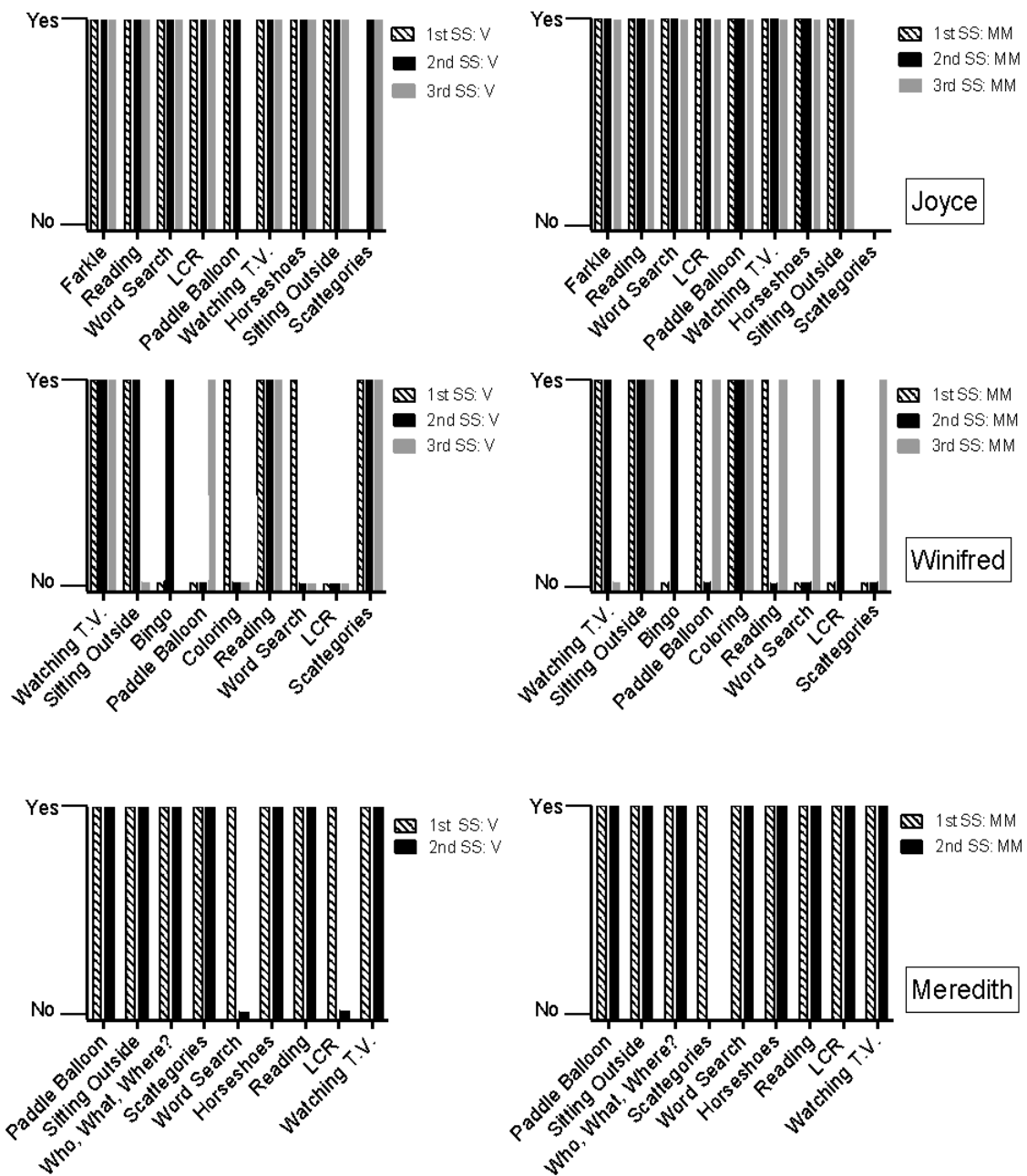


Note. Results of the SS verbal and SS multimedia assessments across time. No bar denotes an answer other than yes or no was given for that item.

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Figure 3

SS Verbal and SS Multimedia Assessment

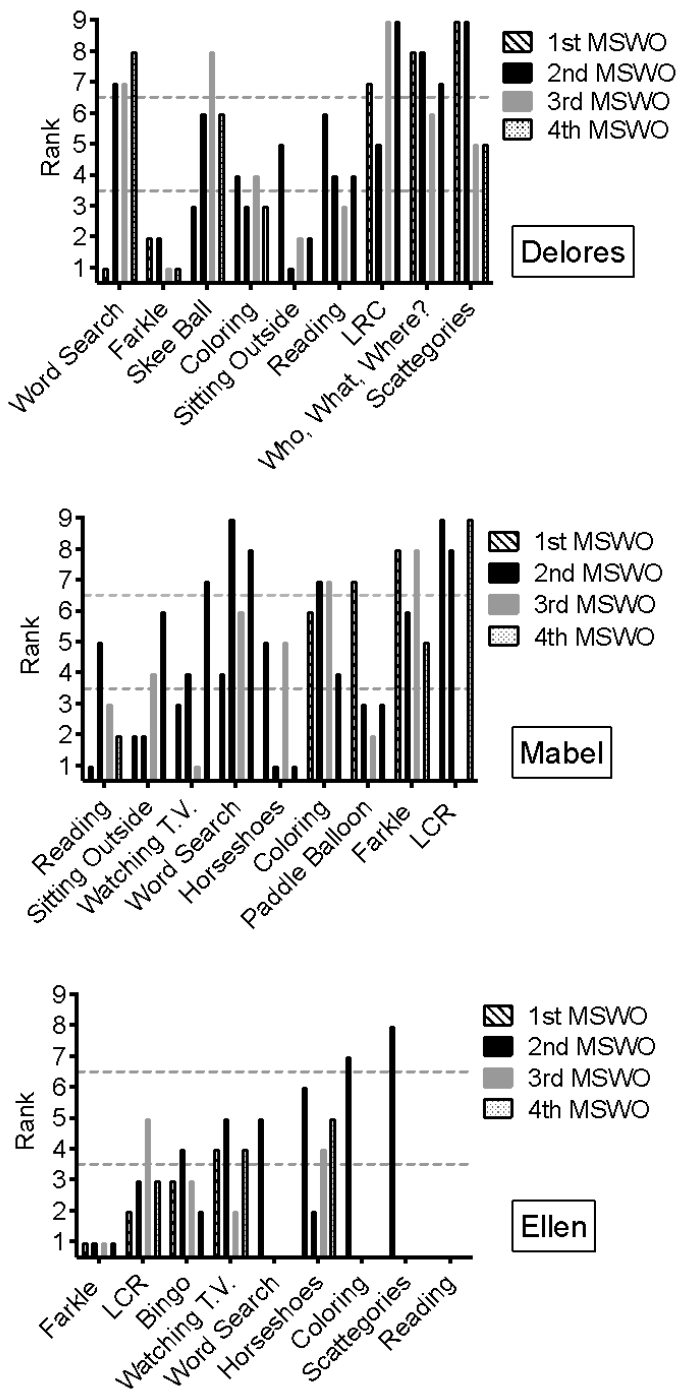


Note. Results of the SS verbal and multimedia assessments across time. No bar denotes an answer other than yes or no was given for that item.

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Figure 4

MSWO Assessment Across Time

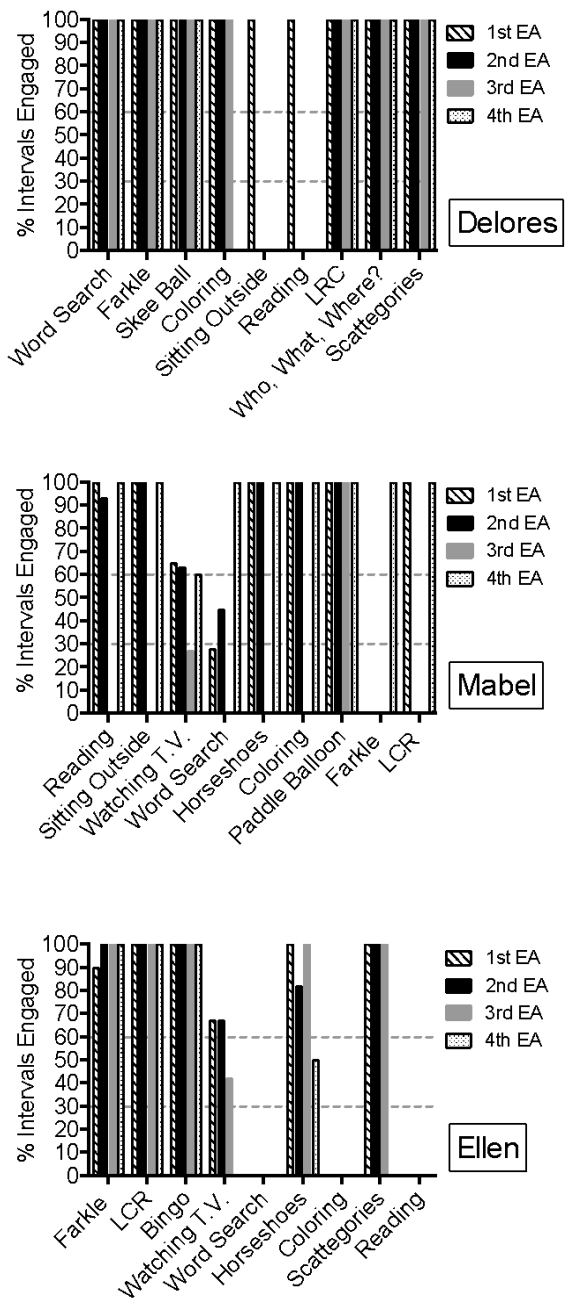


Note. Results of the MSWO assessments across time. No bar denotes the item was eliminated by the participant.

EVALUATION OF PREFERENCE ASSESSMENT PROCEDURES

Figure 5

Engagement Across Time



Note. Percent of intervals engaged during each engagement analysis administration. No bar indicates that the participant declined the activity on two separate occasions. A bar at 0% indicates that the activity was available for 5 min and the participant did not engage.