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Examining Guided and Directed Cues in Strategy Training and Usual Rehabilitation

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Stroke is a leading cause of disability in the United States (Ma, Chan, & Carruthers, 2014; Ovbiagele, Goldstein, Higashida, Howard, Johnston, Khavjou, Lackland, Lichtman, Mohl, Sacco, Saver, & Trogon, 2013). Direct and indirect costs related to stroke are expected to rise in the coming decades, as more people survive stroke and live longer (Ovbiagele et al., 2013). Post-stroke cognitive deficits are common (Nys, van Zandvoort, de Kort, Jansen, de Haan, & Kappelle, 2007) and persist over time (Mellon, Brewer, Hall, Horgan, Williams, & Hickey, 2015; Patel, Coshall, Rudd, & Wolfe, 2003). Individuals with post-stroke cognitive deficits have poor functional outcomes (Barker-Collo, Feigin, Lawes, Parag, & Senior, 2010), and poor health-related quality of life over the long-term (Mitchell, Kemp, Benito-Leon, & Reuber 2010).

While most agree that the best time to intervene is early in post-stroke recovery (Winstein, Arena, Bates, Cherney, Cramer, Deruyter, Eng, Fisher, Harvey, Lang, MacKay-Lyons, Ottenbacher, Pugh, Reeves, Richards, Stiers, & Zorowitz, 2016), the best therapeutic approach is unclear. Rehabilitation interventions are typically defined and studied with respect to the deficit or skill area that they address (DeJong, Horn, Gassaway, Slavin, & Dijkers, 2004). For example, people with cognitive impairments may benefit from cognitive training, caregiver training, and environmental adaptation. However, scientists posit that the therapeutic approach to delivering these interventions may also strongly influence rehabilitation outcomes (Dijkers, Hart, Whyte, Zanca, Packel, & Tsaousides, 2014).

Guided discovery is a therapeutic approach that uses open-ended statements or questions (hereafter referred to as guided cues) to elicit the client's own abilities to identify and solve problems through reflection on successes and failures when performing therapeutic activities (Wales, Nardi, & Stager, 1986). Guided discovery has been associated with significantly higher levels of independence over time after stroke when combined with goal-oriented skill-based training (Skidmore, Dawson, Butters, Grattan, Juengst, Whyte, Begley, Holm, &

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Conflict of interest:

The authors declare that there is no conflict of interest.

Neither author has financial or proprietary interest in the materials presented

Ethics and patient consent:

Procedures followed in this study (NCT #: 01934621) were in accordance with ethical standards of the institutional review board (IRB #: PRO13070029). All participants in the analysis provided informed consent.

Becker, 2015). While guided discovery has been associated with positive rehabilitation outcomes after stroke in experimental studies, the prevalence of this therapeutic approach in usual rehabilitation care is unknown.

Given the promise of guided discovery for promoting independence, we sought to determine the degree to which guided cues (indicators of the use of guided discovery) were present in usual care rehabilitation. In particular, we compared the use of guided cues in experimental intervention sessions designed to optimize the use of guided discovery with the use of guided cues in usual care occupational and physical therapy sessions. These analyses were completed with a sample of people who were receiving each of these therapy sessions in inpatient rehabilitation as part of an ongoing clinical trial.

Methods

All procedures were approved by the University Institutional Review Board. All participants provided informed consent. Data were collected as part of a randomized controlled trial examining the efficacy of an experimental strategy training during inpatient rehabilitation. Participants were recruited at the onset of inpatient rehabilitation and had a primary diagnosis of acute stroke within 30 days of rehabilitation admission and cognitive impairments (Executive Interview, 14-item version 3) (Larson & Heinemann, 2010). Individuals were excluded if they had severe aphasia (Boston Diagnostic Aphasia Examination severity rating of 0 or 1) (Goodglass, Kaplan, & Baressi, 2001), prior mild cognitive impairment or dementia, current major depressive disorder, recent substance abuse (previous 3 months), or current psychotic disorder (Primary Care Evaluation of Mental Disorders (Spitzer, Kroenke, & Williams, 1994) and the Mini International Neuropsychiatric Interview) (Sheenan, 1998).

In the parent study (details on this ongoing clinical trial available at [clinicaltrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT01934621), NCT#01934621), eligible participants were randomized to receive an experimental intervention called strategy training (one session per day for 10 days) or a non-active control intervention (same dose), both in addition to usual inpatient rehabilitation. For the current analyses, we examined strategy training participants only. Strategy training consisted of four elements: client-selected activity-based goals, client self-evaluation and self-monitoring of goal-based performance, global strategy training (“Goal, Plan, Do, Check”), and therapist-delivered guided discovery (measured through guided cues). Previous reports suggest that guided cueing may be an essential element, encouraging participants to develop their own effective strategies and generalize these strategies across daily tasks (Skidmore, Butters, Whyte, Grattan, Shen, & Terhorst, 2016). Experimental strategy training sessions were provided by trained occupational and physical therapists (clinical experience ranging from 1–20 years) who augmented the usual care team; procedures are described in more detail elsewhere. (Skidmore et al., 2015).

Usual inpatient rehabilitation was comprised of a minimum of two sessions of occupational therapy, two sessions of physical therapy, and as many as one to two sessions of speech language pathology per day. For the current analyses, we examined occupational and physical therapy sessions only, as only 20% of participants in this analysis received usual

care speech language pathology. Usual care occupational and physical therapy sessions focused on deficit reduction and skill-based training, and were provided by trained clinical therapists who were members of the usual care team. Usual care sessions took place in the participant's room, therapy gyms, the kitchen, the hospital hallways, the hospital stairs, or outside on the hospital grounds. Usual care occupational therapy sessions included but were not limited to functional therapeutic activities for the upper extremities, meal preparation, laundry, and transfers. Usual care physical therapy sessions included but were not limited to walking, navigating stairs, transfers, and completing therapeutic exercise.

For the current analyses, we randomly selected one strategy training (experimental) session video, one occupational therapy (usual care) session video, and one physical therapy (usual care) session video for the first 20 strategy training participants using a computer-generated random number. For experimental strategy training sessions, which were completed in private treatment areas, the strategy training therapist used a video recorder on a tripod. For usual care occupational and physical therapy sessions, a member of the research team obtained permission from the rehabilitation team and research participant to record up to two sessions of occupational and physical therapy in inpatient rehabilitation. The member of the research team then attended these sessions and operated the video recorder to ensure that only the treating therapist and participant were recorded during the session. Evaluation sessions were excluded from recording as they provided no opportunity to observe skill-based training. Morning activities of daily living sessions were also excluded from recording to preserve the participants' privacy.

To examine presence of guided discovery in the experimental strategy training sessions and in usual rehabilitation care, we used a standardized and reliable coding scheme that characterizes the types of cueing (guided verbal cues, guided gesture cues, directed verbal cues, and directed gesture cues) that the therapist used during skill-based training (Urquhart & Skidmore, 2014). Guided verbal cues consist of the therapist facilitating client choice or problem solving. Examples include, "What do you want to address in therapy today? What is another way that you could put your shirt on? Walk me through how you will put your shirt on." Guided gesture cues consist of visual cues that encourage a client to scan his or her environment of personal space. For example, a therapist may use a broad gesture to encourage a client to scan a room to identify potential safety hazards without directly pointing to them. Direct verbal cues are therapist-delivered instructions on what action to perform or how to perform it. Examples include: "Today we are going to work on dressing. Put your arm in the sleeve. Watch what you're doing." Direct gesture cues include pointing or tapping a relevant area to draw attention. Examples include tapping a body part the therapist wants the client to move or pointing to an object the client is seeking. Physical assistance was excluded from these analyses, because it was not possible to discern from the videos whether physical assistance was guided or directed in nature. For example, moderate physical assistance to support a bed-to-chair transfer for a client with weakness was excluded from the coding because video did not provide enough data to assess whether physical assistance during this transfer was guided or directed.

All video coding was completed by the first author, who was an independent evaluator (not providing treatment in either experimental strategy training sessions or usual care sessions).

The independent evaluator in this study demonstrated high inter-rater reliability with a second independent evaluator in the laboratory, an occupational therapist with 6 years of experience in rehabilitation and research (Intra-class Correlation Coefficient, ICC, were .96 for guided cues, and .97 for directed cues, assessed on 20 videos). From the video coding, we gleaned two variables: number of cues per minute and proportion of guided cues relative to directed cues. We conducted descriptive analyses, examining the average number of cues per minute and average proportion of guided and directed cues observed in each of the three types of sessions (experimental strategy training, occupational therapy, and physical therapy).

Results

Participant characteristics are presented in the Table. The majority of participants were white (75%) and female (60%) with an average age of 66 years ($SD=13$) and an average education of 15 years ($SD=2.3$). The majority of participants had an ischemic stroke (80%) in the right hemisphere (65%). Cortical (55%) and subcortical (45%) lesions were well-represented in the sample. On average, participants presented with mild stroke severity (National Institutes of Health Stroke Scale $M=5.8$, $SD=2.7$) and moderate disability (Functional Independence Measure $M=67.4$, $SD=13.9$) with an average length of stay of 21 days ($SD=7$). Participants sustained mild to moderate impairments in cognition at study admission (Executive Interview, 14-item version, $M=7.7$, $SD=3.2$), with 15% ($n=3$) sustaining neglect and 40% ($n=8$) sustaining hemianopsia. Participants sustained moderate impairment in motor function (Chekoke McMaster Assessment Impairment Inventory, Arm Scale $M=3.4$, $SD=1.2$, Leg Scale $M=3.4$, $SD=1.2$).

Among the analyzed videos, time spent in the session was comparable across groups among experimental strategy training ($M=31$ minutes, $SD=14$); occupational therapy ($M=26$ minutes, $SD=10$); and physical therapy ($M=23$ minutes, $SD=14$). Experimental strategy training sessions on average had fewer cues per minute ($M=2.6$, $SD=1.3$) than occupational therapy ($M=3.5$, $SD=2.2$) and physical therapy ($M=3.4$, $SD=1.7$).

Usual care rehabilitation contained lower proportions of guided cues (verbal cues) than directed cues (verbal and gesture cues). No guided gesture cues were observed in the sampled sessions. On average, 96% of cues during occupational therapy sessions were directed cues (verbal and gesture), while 4% were guided cues. Similarly, 97% of cues during physical therapy sessions were directed while 3% were guided cues. Conversely, 57.5% of strategy training cues were directed, while 42.5% were guided cues (see figure 1). When examining the ratio of cues for each individual session, patterns persist for proportions of guided versus directed cues; however, there is greater variance in proportions of guided cues in the experimental strategy training intervention than usual care rehabilitation. The range of the proportions of guided cues for individual sessions was smaller for usual care occupational therapy sessions (0% to 25%) and physical therapy session (0% to 33%), than for the experimental strategy training sessions (18% to 91%) (see figure 2).

Discussion

Guided cues, relative to directed cues, have been associated with superior rehabilitation outcomes, as measured by the Functional Independence Measure (Skidmore et al., 2016; Stineman et al., 1996), and are believed to be associated with good engagement in therapy and generalization of skills (Polatajko, McEwen, Ryan, & Baum, 2012). In this study, we observed significantly few cues per minute and significantly higher proportions of guided cues in experimental strategy training sessions compared to usual care occupational and physical therapy, suggesting that usual rehabilitation care may have limited use of guided cueing and may benefit from increased levels of guided cues to bolster rehabilitation outcomes. As we used proportion of guided cues as an indicator of the use of guided discovery, our findings suggest that guided discovery was not routinely employed in usual rehabilitation care in this analysis. The functional implications of this is yet unclear, until the ongoing clinical trial is completed.

It is important to note that the range of guided cues used in experimental strategy training sessions varied widely in this analysis (18% to 91%) suggesting that therapists may have adapted their use of guided cues based on client need. For example, it may be that as clients demonstrated the ability to safely execute an activity and solve problems, the therapist may have provided less overall direction. As clients demonstrated risks for safety concerns, more direction may have been provided, with less guided cues provided in the balance. The implications of this variance in guided cues for functional outcomes is unclear, but should be examined in future analyses. Furthermore, a more detailed analysis on the reasons for this variance would add additional insight to inform future use of guided cues in usual rehabilitation care.

One benefit of guided cues is that they provide opportunities for clients to actively engage in treatment (rather than merely responding to therapist direction). Client engagement in therapy has been consistently cited as a critical component of rehabilitation (Bright, Kayes, Worrall, & McPherson, 2015; Lenze, Munin, Quear, Dew, Rogers, Begley, & Reynolds III, 2004; Paolucci, Di Vita, Massicci, Traballes, Bureca, Matano, Iosa, & Guariglia, 2012), and evidence suggests that therapeutic approach significantly affects client participation in therapy (Horton, Howell, Humby, & Ross, 2011; Pyöriä, Talvitie, Nyrkkö, Kautiainen, Pohjolainen, & Kasper, 2007; Skidmore et al., 2016). One study analyzing the client-provider interaction for individuals with stroke revealed that instructional strategies in which the therapist used an “initiation, response, feedback” approach were associated with a passive client response as the therapist exercised control over the activity. For example, the therapist may provide a stimulus by placing medicine bottles in front of the client and tell the client to unscrew the caps (initiation). As the client begins to unscrew (response), the therapist may direct comments on performance of this discrete task (feedback). In contrast, a “question-answer” approach, where the therapist asks a client a broad question [“show me how you manage your medication (question)” allowing the client to organize, initiate, and complete the full task (answer)], was associated with active client engagement and problem solving (Horton et al., 2011). Active engagement and problem solving, elicited through verbal and visual guided cues has been associated with more significant reductions in cognitive impairment and disability compared to those receiving usual care (Pyöriä et al.,

2007), or those receiving directed cueing (Skidmore et al., 2016). While the benefits of guided cues for prompting client problem solving show promise for individuals with cognitive deficits, our data suggest that guided cues are sparse in usual care rehabilitation. Taken together, the evidence for the use of guided cues when treating individuals with cognitive deficits post stroke and our data showing that this cueing method is rarely used in usual care, warrant further study of how therapist approach and feedback influences client outcomes.

There are limitations to this analysis and therefore results should be interpreted with caution. The study examined videos from a small sample size collected within a single institution, limiting generalizability. Participant inclusion criteria were narrow requiring individuals to have stroke-related cognitive impairments with only mild to no aphasia, also limiting generalizability. While use of guided cues in therapy shows promise for promoting client engagement and generalization of skills, more research is needed to better understand the relationship between the use of guided cues and overall functional outcomes.

Conclusion

Based on a small sample, we noted meaningful differences in the use of guided cues between strategy training, an experimental intervention, and usual care rehabilitation. These differences suggest that there may be limited use of guided discovery in usual rehabilitation care. Therefore, these differences may be important when seeking to optimize rehabilitation for individuals with stroke-related cognitive differences. This study needs to be replicated with larger samples and in multiple centers to determine if these differences observed in this analysis are representative of rehabilitation practice in general. Additional examination of the functional outcomes attributed to these differences is also needed.

Implications for Occupational Therapy

The current study explicates our understanding of guided cues as a therapeutic approach in occupational therapy practice. We used a standardized coding system to isolate and quantify guided cues in rehabilitation, and to detect meaningful differences in the use of guided cues in strategy training and usual care rehabilitation. The implications of these differences on functional outcomes require further study.

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Figure 1.
Proportion of Directed and Guided Cues by Session Type

Figure 2.
Percentage of Guided Verbal Cues by Session Type and by Participant

Table**Participant Characteristics**

	n=20
Sex, male, n (%)	8 (40)
Age, years, M (SD)	66.3 (13.0)
Race, white, n (%)	15 (75)
Education, years (M) (SD)	14.9 (2.3)
Stroke type, ischemic, n (%)	16 (80)
Hemisphere, right, n (%)	13 (65)
Level of injury, cortical, n (%)	11 (55)
Stroke severity NIHSS, M (SD)	5.8 (2.7)
Baseline disability, FIM, M (SD)	67.4 (13.9)
Cognition, EXIT, M (SD)	7.7 (3.2)
Neglect, present, n (%)	3 (15)
Hemianopsia, present, n (%)	8 (40)
Motor impairment, arm, CMA, M (SD)	3.4 (1.2)
Motor impairment, leg, CMA, M (SD)	3.4 (1.0)
Length of stay, days, M (SD)	20.8 (7.0)

Note. NIHSS=National Institutes of Health Stroke Scale. EXIT=Executive Interview, 14-item version. CMA=Chedoke McMaster Assessment Impairment Inventory. FIM=Functional Independence Measure.