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Financial Capacity Following Traumatic Brain Injury: A Six-Month Longitudinal Study

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Abstract

Objective—To longitudinally investigate financial capacity (FC) following traumatic brain injury (TBI).

Design—Longitudinal study comparing FC in cognitively healthy adults and persons with moderate to severe TBI at time of acute hospitalization (Time 1) and at six months post injury (Time 2).

Setting—Inpatient brain injury rehabilitation unit.

Participants—Twenty healthy adult controls and 24 adult persons with moderate to severe TBI.

Main Outcome Measures—Participants were administered the Financial Capacity Instrument (FCI-9), a standardized instrument that measures performance on eighteen financial tasks, nine domains, and two global scores. Between and within group differences were examined for each FCI-9 domain and global scores. Using control group referenced cut scores, participants with TBI were also assigned an impairment rating (intact, marginal, or impaired) on each domain and global score.

Results—At Time 1, participants with TBI performed significantly below controls on the majority of financial variables tested. At Time 2, participants with TBI demonstrated within group improvement on both simple and complex financial skills, but continued to perform below adult controls on complex financial skills and both global scores. Group by time interactions were significant for five domains and both global scores. At Time 1, high percentages of participants with TBI were assigned either ‘marginal’ or ‘impaired’ ratings on the domains and global scores, with significant percentage increases of ‘intact’ ratings at Time 2.

Conclusions—Immediately following acute injury, persons with moderate to severe TBI show global impairment of FC. Findings indicate improvement of both simple and complex financial

skills over a six month period, but continued impairment on more complex financial skills. Future studies should examine loss and recovery of FC following TBI over longer time periods and a wider range of injury severity.

Keywords

Financial capacity; financial decision making; competency; traumatic brain injury; head injury

Introduction

Decisional capacity is a topic of ethical and clinical importance and increasing scientific interest in the field of traumatic brain injury (TBI) (Anderson & Fearey, 1989; Haffey, 1989; Hoskin, Jackson, & Crowe, 2006; Marson et al., 2005; Reid-Proctor, Galin, & Cummings, 2001). The abrupt cognitive, emotional, and behavioral changes following TBI can devastate decisional capacity, substantially impair everyday functioning and independence (Fisk, Schneider, & Novack, 1998; Lundqvist, 2001; Marson et al., 2005), and persist long after acute hospitalization. Impaired decisional capacity presents significant challenges for clinicians, who frequently must determine if a person has decisional capacity following acute injury, or has experienced sufficient cognitive and emotional recovery during rehabilitation to resume autonomous decision-making (Marson et al., 2005).

Despite its importance, little empirical research has addressed decisional capacity in TBI. Our group has previously found that following moderate to severe TBI there is substantial initial impairment and only partial recovery of treatment consent abilities over a six-month period (Marson et al., 2005). In a separate study, we found that short term verbal memory, executive function, and working memory were associated with impairment and recovery of consent capacity in TBI (Dreer et al., 2008).

Another important decisional capacity affected in TBI is financial capacity (FC). The capacity to manage financial affairs is considered a fundamental instrumental activity of daily living (IADL) critical to independent functioning of adults in our society (Marson et al., 2000). FC has been conceptualized as a broad set of simple and complex abilities, including counting coins/currency, making daily purchases, managing a checkbook, paying bills, making investment decisions, and exercising financial judgment (Gaudette & Anderson, 2002; Marson et al., 2000). For these reasons, FC has been found to be an “advanced” activity of daily life, conceptually and statistically distinct from “household” activities of daily life and “basic” activities of daily life (Marson et al., 2000). Similar to driving and mobility, FC is a core aspect of individual autonomy in adults (Kane & Kane, 1981; Marson, 2001), and possibly the best single litmus for capacity to live independently (Marson et al., 2000).

Clinical issues concerning FC are common following TBI (Fong et al., 2010; Gaudette & Anderson, 2002). At a time when a person may be unconscious or confused, important financial decisions still need to be made on a daily basis. Examples include understanding health insurance coverage and policies, applying for disability claims, filing lawsuits (i.e., for injuries sustained), as well as handling everyday financial transactions (i.e., paying mortgage, rent, utilities, child support), managing credit card accounts, and staying within a

budget. Many of these financial matters are time sensitive and require attention within days or weeks of the injury (Pressman, 2007). Without such attention post-injury, a range of negative consequences can result (late and overdraft fees, unpaid debts, poor credit rating, depletion of savings, scams, and bankruptcy) (Hollingworth, Relyea-Chew, Comstock, Overstreet, & Jarvik, 2007; Relyea-Chew et al., 2009). Thus, following acute TBI, the injured person or family proxy/legally authorized representative (LAR) must engage in and carry out a range of critical financial decisions.

A significant challenge for rehabilitation clinicians is determining whether an acutely injured person possesses sufficient decisional capacity to engage in financial decision-making. Similarly, in cases of more severe injury where decisional capacity is initially lost, it can be difficult to determine whether there has been sufficient recovery to permit resumption of financial decision-making. Standard mental status screens are not accurate or accepted predictors of decisional capacity (Marson & Dreer, 2007), and basing a decision to restore or limit decisional autonomy on ability to perform neuropsychological tests (e.g., Trails B) raises troubling clinical practice and civil liberty issues. Further complicating the issue for clinicians can be conflict between TBI survivors and their family members over resumption of financial decision-making. Although there is often significant cognitive improvement over time, continuing problems with poor self-awareness and insight, impulsivity, disinhibition, and short term memory may make resumption of financial decision-making highly problematic.

Currently there is limited empirical research on FC in TBI that can inform clinical practice. Only a handful of studies to date have examined primarily narrow financial skills in TBI such as use of virtual or real automated teller machines [ATM] (Fong et al., 2010), as well as a somewhat broader set of monetary skills including identifying coins and bills, making written numeric calculations, using a calculator, bill paying, and completing a deposit ticket (Crowe, Mahony, & Jackson, 2004; Gaudette & Anderson, 2002). However, these studies have suffered methodological limitations such as the use of measures with poorly defined psychometric properties. There is a significant need for empirical studies that more comprehensively address the FC construct and that investigate the natural history of FC in TBI from time of acute injury over the course of recovery (Crowe et al., 2004; Gaudette & Anderson, 2002; Mukherjee, Heller, & Alper, 2001).

In the present study, we longitudinally investigated FC in cognitively healthy adults (controls) and persons with moderate and severe TBI. While the course of the neurocognitive recovery trajectory of approximately 18 to 24 months is typically expected, we focused on the immediate six months post-injury in this initial study in this area in an effort to establish potential recovery of FC (Green et al., 2008; Ruttan, Martin, Liu, Colella, & Green, 2008). We used a standardized psychometric instrument developed by our group that directly examines performance on a range of financial skills (*Financial Capacity Instrument*) (FCI-9) (Earnst et al., 2001; Griffith et al., 2003; Marson et al., 2000; Martin et al., 2003). The reliability and validity of the FCI-9 has been studied extensively among individuals with neurodegenerative diseases. As the measure is designed to examine performance on a range of financial skills relate to everyday living, this instrument holds great promise for evaluating FC among persons with TBI. Therefore, using the FCI-9, we

examined within and between group differences in financial capacity during the acute hospitalization period (Time 1) and also at six-month follow-up (Time 2). We hypothesized that at Time 1, persons with TBI would demonstrate deficits relative to controls on complex financial skills and abilities. We further hypothesized that at six-month follow-up, participants with TBI would show improvement in complex skills but would remain impaired relative to controls

Methods

Participants

Thirty-four persons with moderate to severe TBI were recruited through the TBI inpatient service at the University of Alabama at Birmingham (UAB) as part of a larger Traumatic Brain Injury Model Systems (TBIMS) grant (NIDRR, H133A980010). Patients were initially approached to participate in the TBIMS study. Following this procedure, patients were invited to participate in this separate study on FC during the years 1999 to 2001.

Inclusion criteria for moderate to severe TBI included an initial Glasgow Coma Scale (GCS) (Teasdale & Jennett, 1974) of 12 or less, posttraumatic amnesia (PTA) continuing a day or more, and/or objective signs of structural lesion on cranial computed tomography (CT) or cranial magnetic resonance imaging scan (MRI) (i.e., contusion or hematoma). *Excluded* were those with a history of any other disease or condition potentially affecting cognition, such as psychiatric disturbance (with the exception of mild depression), substance abuse, cerebrovascular disease, or other neurologic diseases (excluding headache).

Twenty-six control participants were recruited through advertisements at UAB and in a Birmingham newspaper. Controls were without any diseases or conditions that could potentially affect cognition, including psychiatric disturbance (except mild depression), substance abuse, cerebrovascular disease, or other neurological diseases (excluding headache). None of the controls were taking any medications known to significantly affect cognition. Recruitment of the control participants was also selective and involved individual demographic matching of controls with participants with TBI based on age, gender, ethnicity, and educational level.

The final sample of participants who were recruited and completed both baseline and 6-month follow-up visits included 20 adult controls and 24 participants with TBI. Informed consent was obtained from all participants, or their caregivers or legally authorized representative (LAR), in accordance with procedures of the UAB Institutional Review Board. All participants received monetary compensation for their participation at each of the two study visits.

Measures

Financial Capacity Instrument—The Financial Capacity Instrument (FCI-9) is a conceptually based, objective psychometric measure for direct assessment of financial skills and abilities (Marson, 2001; Marson et al., 2000). The FCI-9 evaluates financial capacity at three levels: specific financial abilities (tasks), broader financial activities (domains), and two global levels representing overall financial capacity (global) (Earnst et al., 2001;

Marson, 2001; Marson et al., 2000). A schematic of the FCI-9 is presented in Table 1. The FCI-9, which has good reliability and validity, comprises eighteen tasks, nine domains, and two global level scores (domains 1-7 total score; domains 1-7 and 9 total score [inclusion of investment decision-making]). Domain 8 is considered an experimental domain as it requires a collateral source to verify information obtained from the participant, and it is not included in the global scores.

The FCI-9 has an operationalized and detailed scoring system (Marson, 2001; Marson et al., 2000). It uses interval level scoring to assess participant performance on tasks. Task scores are summed to obtain domain scores, and domain scores are summed to obtain global level scores. Higher scores on the FCI-9 indicate greater financial abilities.

Procedures

All participants with TBI underwent a baseline (Time 1) assessment of financial capacity and neuropsychological status during their inpatient stay at Spain Rehabilitation Center at UAB. The baseline assessment was conducted when participants with TBI's confusional states and post-traumatic amnesia had cleared. Participants with TBI underwent a follow-up assessment (Time 2) at the UAB Department of Neurology six months after their TBI, with a scheduling window of four weeks. Control participants underwent identical baseline and six month follow-up assessments at the UAB Department of Neurology.

Statistical Analyses

Performance on FCI-9 Variables—Performance on all FCI-9 variables was evaluated using a mixed factors MANOVA model with a between groups factor (control, TBI) and a within-groups repeated measures factor of time (Time 2). Subsequent univariate planned comparisons were conducted using independent-samples t-test to evaluate baseline and follow-up differences across groups, and paired t-tests to evaluate differences over time within each participant group.

TBI Participant Impairment Ratings—Impairment ratings on the nine domains and two global scores were assigned to individual participants with TBI using cut scores derived from control group performance. For each domain and global score, the cut score for distinguishing *intact* from a *marginal* rating was set at 1.5 *SD* below the control mean for the variable. The cut score for distinguishing a *marginal* from an *impaired* rating was set at 2.5 *SD* below the control group mean (Marson et al., 2000).

Statistical Significance—An alpha value of .05 was adopted for significance across all analyses. All statistics were performed using PASW version 18.

Results

Demographic and Mental Status Variables

Table 2 includes demographic and mental status variables for cognitively healthy controls and participants with TBI who completed both baseline and 6-month follow-up. As discussed above, individual demographic matching of controls with participants with TBI

occurred during the recruitment phase. There were no group differences in terms of gender, age, racial/ethnic background, or educational level. The group of participants with TBI included 19 Caucasian and 5 African-American participants, and the average level of education was 12 years.

For, the average GCS score at the time of acute hospitalization was 7.1 (SD = 3.2) and was indicative of moderate to severe injury. Participants with TBI obtained an average Galveston Orientation and Amnesia (GOAT) score of 89.6 at baseline and 93.0 at 6-month follow-up. There was no GOAT score available for one participant with TBI at baseline and no GOAT score was available for two participants at 6-month follow-up.

Performance on the FCI-9 at Baseline (Time 1)

Table 3 provides information on FCI-9 performance of the control and TBI groups at baseline and 6-month follow-up. Performance on all FCI-9 domains was evaluated using a mixed factors MANOVA model with a between groups factor (control, TBI) and a within-groups repeated measures factor of time (Time 2) which was significant, $F(16, 19) = 6.00$, $p < .001$. At baseline, controls performed significantly better than participants with TBI on all FCI-9 domains and both global scores (all p 's $< .012$). Thus, contrary to our hypothesis, at the time of acute hospitalization survivors of TBI showed significant impairment on both simple as well as complex financial tasks and domains. For example, at baseline participants with TBI performed significantly below controls on an elementary domain such as Basic Monetary Skills (Domain 1, $p < .012$) which involves basic financial tasks such as naming coins, understanding coin/currency relationships, and counting money. Participants with TBI also performed significantly below controls on other simple domains as well such as Financial Concepts (Domain 2, $p < .001$) which requires understanding and applying financial concepts, and Cash Transactions (Domain 3, $p < .001$) which evaluates performance on tasks such as one item and multi-item transactions, vending machines, and tipping. Significant differences were also observed on more complex domains including Check Book Management (Domain 4), Bank Statement Management (Domain 5), Financial Judgment (Domain 6), Bill Payment (Domain 7), Investment Decision Making (Domain 9), and global financial capacity with participants with TBI demonstrating greater impairment on these domains compared to adult controls at baseline (all p 's $< .001$).

Performance on the FCI-9 at Six Month Follow-Up (Time 2)

Within Group Performance at Follow-Up—At six month follow-up adult controls, with one exception, demonstrated no within group performance changes on the FCI-9 domains, including the two global scores (Table 3). This finding supported expected stability in control performance and minimal practice effects over time. Controls did show improvement on Financial Concepts (Domain 2) ($p < .024$).

In contrast, participants with TBI demonstrated within group performance improvement on seven of the nine domains, and both overall scores (Table 3). Improvement within group occurred on both simple and complex tasks and domains. The results supported the hypothesis that acutely injured participants with TBI experience some improvement of financial abilities over a six month follow-up. Participants with TBI did not show significant

within group improvement for the domains of Financial Judgment (Domain 6) and Knowledge of Assets/Estate Arrangements (Domain 8) (experimental), although raw score improvement occurred on both of these domains.

Between Group Performance at Follow-Up—Participants with TBI at follow-up performed equivalently to adult controls on simple domains such as Basic Monetary Skills (Domain 1), Cash Transactions (Domain 3), and Financial Judgment (Domain 6). This finding suggested that, over a six month period, those experiencing moderate to severe TBI experience improvement in performance levels for certain basic financial skills (See Table 3).

However, such improvement did not occur for more complex financial domains (Table 3). Specifically, at follow-up participants with TBI continued to fall significantly below controls on six of nine domains (including complex domains such as Financial Concepts [Domain 2], Checkbook Management [Domain 4], Bank Statement Management [Domain 5], Bill Payment [Domain 7], Assets & Estate Arrangements [Domain 8], and Investment Decisions [Domain 9]), and both global scores (Table 3). These findings suggested that, over a six month period, those experiencing moderate to severe TBI continue to have compromised performance levels for complex financial skills which require a higher level of cognitive processing.

Group by Time Interactions—Group by time interactions were significant for five of nine domains (Basic Monetary Skills, Cash Transactions, Bank Statement Management, Bill Payment, and Investment/Decision-Making) and both global scores (Table 3).

Prior Financial Experience—Because individual financial experience differs across individuals (Marson et al., 2000), we accounted for lack of prior financial skills and experience in our participants. The *Current Financial Capacity Form* (CFCF) (Marson et al., 2000) a rating instrument that identifies a participant's current and prior/premorbid experience across the different FCI-9 variables, was administered to all participants and/or to their informants. Premorbid/prior experience for each task and domain was rated using one of three categories: “could do without help”, “could do but needed help”, or “could not do even with help.” Those who self-reported having no prior experience or ability on a task or domain, or whose informant reported that the participant lacked experience or capacity were identified. This procedure resulted in the exclusion of 6 participants with TBI and one control participant who had no prior experience or ability on a task within a domain. We examined results across domains and tasks with and without the inclusion of the 6 participants with TBI and 1 control participant and the results were the same between the two groups regardless of prior domain/task experience.

Impairment Ratings for Participants with TBI at Baseline and Six Month Follow-up

Table 4 presents impairment ratings for participants with TBI at baseline and six month follow-up for the FCI-9 domains and global scores. At baseline, participants with TBI demonstrated high levels of rating compromise (combination of ‘marginal’ and ‘impaired’ ratings) ($\geq 50\%$ of cases) on six of nine domains, with the highest compromise levels

occurring for the domains of Bank Statement Management (100% compromise), Bill Payment (95%), Cash Transactions (63%), Checkbook Management (61%), and Financial Concepts (58%). Compromise on global score (Domains 1-7) was 95%.

At six month follow-up, there were substantial increases in 'intact' ratings for participants with TBI on virtually all FCI-9 variables tested, with statistically significant increases for four domains (Basic Monetary Skills, Cash Transactions, Bill Payment, Investment Decisions), and for global scores (Table 4). For example, 'intact' ratings for Bill Payment went from 4% (Time 1) to 61% (Time 2) ($p = .002$), for Investment Decisions from 35% to 70% ($p = .007$), and for global score (sum of Domains 1-7) from 6% to 44% ($p = .005$). These changes in categorical percentages also support improvement in FC in participants with TBI at follow-up.

Discussion

This study presents possibly the first empirical longitudinal investigation of FC in persons with TBI. Several key findings emerged. First, shortly after acute hospitalization, moderate to severely injured participants with TBI performed significantly below controls on all financial skills tested, whether simple or complex. This finding indicates that marked loss of financial abilities occurs following moderate to severe TBI.

Second, at six-month follow-up, participants with TBI demonstrated notable within group improvement on both simple and complex financial skills. This finding is consistent with the neurocognitive recovery characteristic following TBI, and with our group's prior finding of improved treatment consent abilities in participants with TBI at six month follow-up (Dreer et al., 2008). The finding of recovery of FC in TBI also supports the value of setting serial assessments and providing strategies to regaining these critical skills in the acute rehabilitation setting.

Third, despite the encouraging skill recovery noted above, participants with TBI at six month follow-up continued to perform significantly below controls on most complex financial skills and domains, and on measures of global FC. Thus, while participants with TBI at follow-up now performed equivalently on some basic financial skills (e.g., naming coins/currency, counting coins/currency), they remained impaired on many other significant skills (e.g., understanding and using a checkbook, understanding and using a bank statement). Thus only partial improvement of FC occurred in the follow-up period.

These study findings have clinical implications. It is likely that immediately after moderate to severe TBI, most survivors will not be able to manage any aspect of their financial affairs. In most cases, there will be an immediate need for education with families and identification of a family member or legally authorized representative (LAR) who can manage their loved one's financial affairs (Mukherjee et al., 2001). Early clinical detection of impaired financial abilities will help protect both the economic resources and emotional well-being of those experiencing TBI and their families.

Health care providers can also prepare injured persons, family members, and/or LARs to expect that while the survivor may recover basic financial skills within 6-months post-

injury, management of more complex financial tasks (checking, bank statements, bill payment, investments) may likely need to remain within the authority of the family member or proxy, at least in the short-term period following a TBI. Efforts to educate injured persons and families about this issue prior to discharge from rehabilitation may facilitate more realistic planning about how to manage immediate financial demands (i.e., payment of hospital bills, working with insurance companies, managing everyday expenses--rent/mortgage, groceries).

The study findings clearly support the need for expanded longitudinal studies of FC in TBI that extend for a year or more. While this initial study in this area focused on studying FC within the immediate 6 months post injury, the findings suggest that further evaluation is needed to assess the FC within the context of the typical neurocognitive recovery trajectory of approximately 18 to 24 months for persons with moderate and severe TBI. In addition, neuropsychological studies are needed of the relationships between cognition and FC impairment at the time of TBI, and over the course of recovery. Multiple neurocognitive functions are likely relevant to a complex capacity like FC, and include impairments in mental and written arithmetic, short term memory, semantic financial knowledge, and executive skills of organization, and good judgment (Crowe et al., 2004; Gaudette & Anderson, 2002).

Limitations to the study exist. The group sample sizes were small, and larger samples over a longer time period are needed to statistically confirm and extend the study findings. Additionally, the small sample size may preclude generalizability of findings until further studies are conducted. Another limitation was the use of laboratory based assessments of financial skills, which although objective, standardized and norm referenced (for persons with neurodegenerative diseases), could not directly replicate the everyday financial decision-making settings and activities of study participants. A third limitation was related to the fact that participation in rehabilitation therapies (e.g., inpatient, outpatient, or home based) was not monitored. Thus, it is unknown whether or not findings related to FC improvement were attributed to the natural course of recovery and/or rehabilitation efforts undertaken at home subsequent to hospitalization. A fourth limitation was related to the fact that while the current findings have implications for persons with a moderate or severe TBI, the findings may not generalize as well to persons with mild TBI or complicated mild TBI. Further study is needed here. Finally, this was an initial study using the FCI-9 to evaluate FC among a population of persons with TBI. Further studies are needed to replicate findings and establish the specific reliability and validity of the instrument in the TBI population.

These limitations notwithstanding, the study findings are novel and offer valuable insight into both initial impairment and subsequent recovery of financial capacity in persons with TBI.

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Table 1
Schematic of the Financial Capacity Instrument-9 (FCI-9): 18 Tasks, 9 Domains, and 2 Global Scores

Domain and Tasks	Task Description	Difficulty
<i>Domain 1 - Basic Monetary Skills</i>		<i>Simple</i>
Task 1a Naming coins/currency	Identify specific coins and currency	Simple
Task 1b Coin/currency relationships	Indicate relative monetary values of coins/currency	Simple
Task 1c Counting coins/currency	Accurately count groups of coins and currency	Simple
<i>Domain 2- Financial Conceptual Knowledge</i>		<i>Complex</i>
Task 2a Define financial concepts	Define a variety of simple financial concepts	Complex
Task 2b Apply financial concepts	Practical application/computation using concepts	Complex
<i>Domain 3- Cash Transactions</i>		<i>Simple</i>
Task 3a 1 item grocery purchase	Enter into simulated 1 item transaction; verify change	Simple
Task 3b 3 item grocery purchase	Enter into simulated 3 item transaction; verify change	Complex
Task 3c Change/vending machine	Obtain change for vending machine use; verify change	Simple
Task 3d Tipping	Understand tipping convention; calculate/identify tips	Complex
<i>Domain 4- Checkbook Management</i>		<i>Complex</i>
Task 4a Understand checkbook	Identify and explain parts of check and check register	Complex
Task 4b Use checkbook/register	Enter into simulated transaction; pay by check	Complex
<i>Domain 5- Bank Statement Management</i>		<i>Complex</i>
Task 5a Understand bank statement	Identify and explain parts of a bank statement	Complex
Task 5b Use bank statement	Identify specific transactions on bank statement	Complex
<i>Domain 6- Financial Judgment</i>		<i>Simple</i>
Task 6a Detect mail fraud risk	Detect and explain risks in mail fraud solicitation	Simple
Task 6b Detect telephone fraud risk	Detect and explain risks in telephone fraud solicitation	Simple
<i>Domain 7- Bill Payment</i>		<i>Complex</i>
Task 7a Understand bills	Explain meaning and purpose of bills	Simple
Task 7b Prioritize bills	Identify bills; identify overdue utility bill	Simple
Task 7c Prepare bills for mailing	Prepare simulated bills, checks, envelopes for mailing	Complex
<i>Domain 8- Knowledge of Assets/Estate*</i>	Indicate knowledge of asset ownership, estate arrangements	<i>Simple</i>
<i>Domain 9- Investment Decision Making</i>	Understand investment options; determine returns; make decision	<i>Complex</i>
<i>Overall Financial Capacity (Domains 1-7)</i>	Overall functioning across tasks and domains	<i>Complex</i>
<i>Overall Financial Capacity (Domains 1-7 & 9)</i>	Overall functioning across tasks and domains	<i>Complex</i>

* = Experimental domain

Table 2
Demographic and Mental Status Variables Across Groups

Variables	Controls (n = 20) <i>M(SD), range</i>	Participants with TBI (n = 24) <i>M(SD), range</i>	<i>p</i> value
Age	32.2 (13.4), 18-71	30.0 (11.7), 18-57	.633
Gender (M/W)	12/8	16/8	.757
Race			
Caucasian	14	19	
African-American	6	5	.509
Education	13.2 (2.2)	12.2 (2.5)	.800
GOAT			
Time 1	N/A	89.6 (7.2) *	
Time 2	N/A	93.0 (6.7) **	
GCS	N/A	7.1 (3.2)	

* n = 23; one participants missing information

** n = 22; two participants missing information

Table 3
FCL-9 Performance at Time 1 (Baseline) and Time 2 (Six-Month Follow-Up) Across Groups

	Max Score	Controls Time 1 M (SD)	Controls Time 2 M (SD)	p^1	Participants With TBI Time 1 M (SD)	Participants With TBI Time 2 M (SD)	p^2	T ¹	T ²	Group/Time Interaction
Domain 1-Basic Monetary Skills	55	53.4 (2.1)	53.6 (2.4)	.751	48.1 (7.5)	51.5 (5.7)	.010	.012	.334	.026
Domain 2-Financial Concepts	53	42.3 (6.9)	44.7 (6.5)	.024	30.3 (9.9)	35.1 (8.8)	.001	.001	.001	.833
Domain 3-Cash Transactions	32	30.1 (2.4)	29.3 (3.0)	.065	24.4 (5.4)	27.5 (4.4)	.003	.001	.204	.001
Domain 4-Checkbook Mgmt.	58	56.3 (2.6)	57.1 (1.2)	.235	47.5 (9.2)	51.2 (9.3)	.047	.001	.006	.117
Domain 5-Bank Statement Mgmt.	52	48.3 (2.9)	47.9 (2.5)	.594	31.4 (10.2)	39.9 (7.7)	.001	.001	.001	.001
Domain 6-Financial Judgment	28	23.2 (4.9)	23.6 (5.1)	.760	17.0 (6.8)	19.5 (7.2)	.125	.001	.076	.316
Domain 7-Bill Payment	46	42.1 (5.0)	42.2 (4.4)	.961	25.7 (8.5)	35.9 (8.9)	.001	.001	.013	.001
Domain 8-Assets & Estate Arrangements*	24	21.0 (4.5)	22.0 (0.0)	.330	17.7 (3.3)	18.5 (1.8)	.253	.001	.001	.878
Domain 9-Investment Decision Making	19	15.2 (3.0)	14.8 (3.9)	.661	9.1 (4.0)	11.1 (4.5)	.051	.001	.029	.001
FCL Total Score (Domains 1-7)	324	297.1 (16.4)	299.9 (14.0)	.157	229.2 (39.0)	267.4 (32.0)	.001	.001	.001	.001
FCL Total Score (Domains 1-7 & 9)	343	312.8 (17.5)	315.1 (15.8)	.328	238.6 (42.2)	277.3 (34.6)	.001	.001	.001	.001

 p^1 = Within Control group difference from Time 1 to Time 2 p^2 = Within TBI group difference from Time 1 to Time 2T¹ = Between Control and TBI group difference at Time 1T² = Between Control and TBI group difference at Time 2

* = Experimental domain

N = 6 participants with TBI and 1 control were excluded due to lack of experience on one or more domains, precluding their inclusion in the comparison of the FCI Total Scores.

Table 4
Impairment Ratings for Participants with TBI at Baseline and 6-Month Follow-Up

	Intact	Marginal	Impaired	<i>p</i> -value
Domain 1-Basic Monetary Skills				
Baseline	50% (12/24)	8% (2/24)	42% (10/24)	
6-Month Follow-Up	75% (18/24)	8% (2/24)	17% (4/24)	.046
Domain 2-Financial Concepts				
Baseline	42% (10/24)	25% (6/24)	33% (8/24)	
6-Month Follow-Up	54% (13/24)	17% (4/24)	29% (7/24)	.135
Domain 3-Cash Transactions				
Baseline	38% (9/24)	17% (4/24)	46% (11/24)	
6-Month Follow-Up	84% (20/24)	8% (2/24)	8% (2/24)	.005
Domain 4-Checkbook Management				
Baseline	39% (7/18)	22% (4/18)	39% (7/18)	
6-Month Follow-Up	28% (5/18)	28% (5/18)	44% (8/18)	.233
Domain 5-Bank Statement Management				
Baseline	0% (0/19)	5% (1/19)	95% (18/19)	
6-Month Follow-Up	37% (7/19)	5% (1/19)	58% (11/19)	---
Domain 6-Financial Judgment				
Baseline	63% (15/24)	4% (1/24)	33% (8/24)	
6-Month Follow-Up	71% (17/24)	17% (4/24)	12% (3/24)	.112
Domain 7-Bill Payment				
Baseline	4% (1/23)	30% (7/23)	65% (15/23)	
6-Month Follow-Up	61% (14/23)	9% (2/23)	30% (7/23)	.002
Domain 8-Knowledge of Asset/Estate Arrangements				
Baseline	73% (11/15)	27% (4/15)	0% (0/15)	
6-Month Follow-Up	100% (16/16)	0% (0/16)	0% (0/16)	---
Domain 9-Investment Decision-Making				
Baseline	35% (8/23)	30% (7/23)	35% (8/23)	
6-Month Follow-Up	70% (16/23)	17% (4/23)	13% (3/23)	.007
FCI Total Score (Domains 1-7)				
Baseline	6% (1/18)	6% (1/18)	88% (16/18)	
6-Month Follow-Up	44% (8/18)	33% (6/18)	22% (4/18)	.005
FCI Total Score (Domains 1-7 +9)				
Baseline	6% (1/17)	12% (2/17)	82% (14/17)	
6-Month Follow-Up	41% (7/17)	24% (4/17)	35% (6/17)	.019