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The Relationship between Everyday Problem Solving and Inconsistency in Reaction Time in Older Adults

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ABSTRACT

The purpose of the present study was to investigate whether inconsistency in reaction time (RT) is predictive of older adults' ability to solve everyday problems. A sample of 304 community dwelling non-demented older adults, ranging in age from 62 to 92, completed a measure of everyday problem solving, the Everyday Problems Test (EPT). Inconsistency in latencies across trials was assessed on four RT tasks. Performance on the EPT was found to vary according to age and cognitive status. Both mean latencies and inconsistency were significantly associated with EPT performance, such that slower and more inconsistent RTs were associated with poorer everyday problem solving abilities. Even after accounting for age, education, and mean level of performance, inconsistency in reaction time continued to account for a significant proportion of the variance in EPT scores. These findings suggest that indicators of inconsistency in RT may be of functional relevance.

Keywords: Inconsistency; Reaction time; Everyday problem solving; Instrumental activities of daily living; Older adults.

INTRODUCTION

Numerous investigators have questioned the use of traditional measures of cognition to assess the cognitive performance of older adults (e.g., Allaire & Marsiske, 1999; Denney, 1989; Schaie, 1978; Willis & Schaie, 1986). The issue is whether traditional psychometric measures of cognitive abilities adequately reflect older adults' functioning in the real world. Because traditional measures tend to be relatively novel and 'acontextual', these

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researchers have suggested that they may underestimate older adults' performance in everyday contexts where individuals have the opportunity to apply the experience and knowledge they have accumulated over a lifetime. Emerging from these concerns, a large body of research has been devoted to examining the cognitive performance of older adults on tasks that are experienced in everyday situations (e.g., Allaire & Marsiske, 1999; Cornelius & Caspi, 1987; Denney & Pearce, 1989; Willis, 1996; Willis & Marsiske, 1991). The tasks used in studies of everyday cognition and everyday problem solving are considered to be more ecologically valid because they more closely resemble the types of problems and situations confronted by older adults in daily life.

Substantial variability exists in the definitions and approaches used to study everyday cognition and problem solving, with little consensus about defining features and the best methods of assessment (Allaire & Marsiske, 1999; Willis & Schaie, 1993). For example, there are two broad approaches to the examination of everyday cognition and problem solving (Allaire & Marsiske, 2002). One line of investigation has focused on everyday problem solving within the domain of instrumental activities of daily living (IADLs), traditionally using well-structured problems in which there is a single correct answer for each problem (e.g., Allaire & Marsiske, 1999, 2002; Willis & Schaie, 1993; Willis, Jay, Diehl, & Marsiske, 1992). The other approach has examined the social-emotional contexts and influences on everyday problem solving, using less structured problems in recognition of the fact that many problems frequently encountered in daily life are ill-defined (e.g., Berg, Meegan, & Deviney, 1998; Blanchard-Fields, Jahnke, & Camp, 1995). Willis and Schaie (1993) proposed that, despite the heterogeneity, there are certain commonalities underlying the varying approaches to everyday problem solving, namely (1) the application of cognitive abilities and skills to (2) problems experienced in everyday environments that (3) are complex and multidimensional. However empirically, Marsiske and Willis (1995) found little convergence among different measures of everyday problem solving, supporting a multidimensional conceptualization of everyday problem solving. They argued that the field of research needs to move towards specifying precisely what aspects and dimensions of everyday cognition are being studied. In this study, we have elected to focus on everyday problem solving in the domain of IADLs using a well-defined measure for two reasons. First, the domain of IADL represents an important area of functioning for older adults; older adults face these types of tasks on a daily basis and limitations in the ability to perform these tasks, associated with either normal or pathological aging, can compromise their ability to live independently (Fillenbaum, 1985). Second, previous research suggests that stronger associations are found between well-defined measures and basic cognitive abilities than with ill-defined measures (e.g., Allaire & Marsiske, 2002; Marsiske & Willis, 1995).

As a result of differences in definitions and measurement approaches, studies investigating age differences in everyday problem solving and the relationship between everyday problem solving and basic cognitive abilities have yielded inconsistent findings (Allaire & Marsiske, 1999). With respect to age differences, Cornelius and Caspi (1987) examined participants' performance on the Everyday Problem Solving Inventory (EPSI) in which participants were provided with various everyday problems along with four possible solutions for each problem varying in effectiveness. Cornelius and Capsi asked participants to rate the likelihood that they would select each of the possible solutions and found that older adults outperformed younger adults. In contrast, Diehl, Willis, and Schaie (1995) found a negative relationship ($\beta = -.22$, $p < .05$) between age and an observational measure of everyday problem solving, the Observed Tasks of Daily Living. Denney and Pearce (1989) asked participants to verbally describe how they would solve ten practical problems which were specifically designed to give an advantage to older adults (Practical Problems Test). They found that performance increased from the ages of 20 to 40, and decreased thereafter. In comparing three different measures of everyday problem solving, Marsiske and Willis (1995) found that age was negatively associated with performance on the Everyday Problems Test, accounting for approximately 17% of the variance (EPT, Willis & Marsiske, 1993), but unrelated to either Cornelius and Caspi's (1987) Everyday Problem Solving Inventory or Denney and Pearce's (1989) Practical Problems test. Marsiske and Willis (1995) concluded that age differences in everyday problem solving appear to depend upon the measures used and the specific content of the tasks.

Consistent with this conclusion, Allaire and Marsiske (1999) designed a measure of everyday cognition, the Everyday Cognitive Battery, which contained four tests, each designed to assess a single cognitive ability (i.e., inductive reasoning, knowledge, declarative memory, working memory). They found that the everyday tasks involving fluid abilities and memory were negatively related to age (Inductive reasoning: Caucasian subsample $r = -.25$, African-American subsample: $r = -.35$; Declarative Memory: Caucasian subsample $r = -.27$, African-American subsample: $r = -.45$; Working Memory: Caucasian subsample $r = -.24$, African-American subsample: $r = -.29$; all $p < .05$), whereas tasks involving more crystallized abilities remained stable with age. Thus, the relationship between everyday cognition and age was qualified by the particular cognitive demands of the task. According to Willis and Schaie (1993), everyday problem solving involves the application of multiple mental abilities and cognitive processes, and different constellations of abilities and processes are required for different types of everyday problems. As shown by Allaire and Marsiske (1999), age-associated declines in particular cognitive abilities would, therefore, be expected to impact performance on everyday tasks that rely on those cognitive abilities, but not necessarily on tasks that rely more heavily on preserved cognitive abilities.

In line with this notion are studies showing that various more basic cognitive abilities are predictors of problem solving on IADLs. For example, Cornelius and Caspi (1987) reported that the Everyday Problem Solving Inventory was significantly associated with measures of fluid ($r = .29$, $p < .01$) and crystallized abilities ($r = .27$, $p < .01$). Similarly, Diehl et al. (1995) showed that measures of crystallized and fluid abilities had a direct effect in a path analysis on older adults' performance on the Observed Tasks of Daily Living, with fluid abilities showing the strongest correlation (fluid abilities: $\beta = -.48$, $p < .001$; crystallized abilities: $\beta = .22$, $p < .05$) . In addition, the relationship between measures of speed and memory were mediated by fluid and crystallized abilities. On a modified version of the EPT, designed for use with participants with Alzheimer's disease, Willis et al. (1998) and Bertrand, Willis, and Sayer (2001) found that measures of global cognitive status and executive function, together, predicted over half of the variance in everyday problem solving (i.e., 60 and 67%, respectively). Allaire and Marsiske (1999, 2002) reported that measures of inductive reasoning, knowledge, and declarative memory were positively related to everyday cognition ($r = .26$ to $.74$), although the pattern of relationships varied depending on the particular type of everyday task.

Overall, these findings indicate that everyday problem solving on IADLs is a complex, multidimensional activity, with links to age and various basic cognitive abilities, depending on the particular type of task involved. To date, research has focused on whether level of cognitive performance is predictive of everyday problem solving ability. However, short-term inconsistency in cognitive performance has recently received increased attention in other areas of cognitive aging, with researchers arguing that performance inconsistency, or intraindividual variability, is an important phenomenon for study (e.g., Hultsch, MacDonald, Hunter, Levy-Bencheton, & Strauss, 2000; Rabbitt, 2000; Stuss, Pogue, Buckle, & Bondar, 1994). Thus, the purpose of the present study was to examine whether trial-to-trial inconsistency in reaction time (RT) is predictive of everyday problem solving on IADLs.

The term intraindividual variability has been used to refer to change in behaviour that is relatively short-term and reversible (e.g., shifts in emotions, fluctuations in performance), as opposed to change in behaviour that is relatively slow and enduring (e.g., development, learning) (Nesselroade, 1991). In the context of cognitive abilities, the study of intraindividual variability involves measuring fluctuations or inconsistency in performance across short periods of time (e.g., moment-to-moment, day-to-day, week-to-week). Research to date has shown that such inconsistency in performance does not simply represent random errors, but rather appears to be a function of lawful, yet fluctuating, influences on behaviour (Hultsch et al., 2000). For example, research has shown that inconsistency can be reliably measured (Hertzog, Dixon, & Hultsch, 1992; Li, Aggen, Nesselroade, & Baltes, 2001; Rabbitt, Osman, Moore, & Stollery, 2001; Slifkin & Newell, 1998) and is substantial in magnitude even after accounting for practice effects, material effects, or other systematic changes over time (Li et al., 2001). Inconsistency also tends to be a relatively stable characteristic of an individual, such that some individuals are consistently more variable than others across time intervals and across tasks (Hultsch et al., 2000; Rabbitt et al., 2001).

Several researchers have suggested that inconsistency may be a behavioural marker of compromised neurological mechanisms associated with aging, disease, or injury (e.g., Bruhn & Parsons, 1977; Li & Lindenberger, 1999). Specifically, Hendrickson (1982) suggested that inconsistency in RT results from random errors in the transmission of neural signals in the central nervous system. Li and Lindenberger (1999) further proposed that an increase in random variability in the central nervous system, due to age-related breakdowns in the modulation of neurotransmitter systems, might result in the age-related increase in inconsistency observed at the behavioural level. Many studies have shown that older adults are more inconsistent than younger adults on measures of RT (Anstey, 1999; Fozard, Vercruyssen, Reynolds, & Hancock, 1994; MacDonald, Hultsch, & Dixon, 2003; Salthouse, 1993; West, Murphy, Armilio, Craik, & Stuss, 2002), finger tapping and time estimation (Shammi, Bosman, & Stuss, 1998), episodic memory (Hertzog et al., 1992; Li et al., 2001), semantic memory (Knotek, Bayles, & Kaszniak, 1990), and lexical and semantic decisions tasks (MacDonald et al., 2003). Importantly, significant group differences in inconsistency have been found even after statistically controlling for group differences in level of performance (e.g., Burton, Strauss, Hultsch, Moll, & Hunter, 2006b; Hultsch et al., 2000; Li et al., 2001; MacDonald et al., 2003).

Inconsistency in RT has also been shown to be predictive of level of cognitive functioning, such that greater inconsistency is associated with poorer level of cognitive performance (Hultsch et al., 2000; Li et al., 2001; Rabbitt et al., 2001). For example, Hultsch et al. (2000) found that greater inconsistency was associated with poorer performance on measures of perceptual speed, working memory, episodic memory, and crystallized ability. Similarly, Rabbitt et al. (2001) reported that greater inconsistency was associated with lower levels of intelligence. In a recent longitudinal study of older adults, MacDonald et al. (2003) showed that not only was inconsistency in RT predictive of changes in level of cognitive performance across a 6 year interval, but that inconsistency and cognitive performance covaried across the 6 years.

Given the previously found links between inconsistency and level of cognitive performance, as well as the associations between basic cognitive abilities and everyday problem solving abilities, our main objective in the present study was to investigate whether inconsistency on measures of RT is also predictive of older adults' ability to solve cognitively complex everyday problems. The ability to solve everyday problems is dependent upon various cognitive abilities, all of which rely upon the integrity of the central nervous system. If increased inconsistency in cognitive functioning is a marker of neurological dysfunction, then compromise of the central nervous system should also be manifested in decreased everyday problem solving ability.

The first aim was to examine the performance of a group of non-demented older adults on the EPT, an instrument designed to measure more cognitively demanding everyday activities. Although this group of older adults was not diagnosed with dementia, they nevertheless demonstrated varying levels of cognitive functioning, and were categorized into three groups (no cognitive impairment and two levels of cognitive impairment) on the basis of cognitive performance on benchmark tasks. We were interested in whether group differences on an everyday problem solving task would be observed even in a sample of participants with very mild cognitive impairments. That is, do older adults with mild levels of cognitive impairment also demonstrate poorer performance in solving everyday tasks compared to older adults with no cognitive impairment?

The second aim of the study was to investigate the association between everyday problem solving abilities and inconsistency in RT. Previous studies, including one conducted in our laboratory with the same sample of participants (Burton, Strauss, Hultsch, & Hunter, 2006a), have shown that various basic cognitive abilities predict older adults' performance on everyday problem solving measures. However, does inconsistency in cognitive performance predict everyday problem solving abilities over and above mean level of cognitive performance? Specifically, we examined the relationships between everyday problem solving and inconsistency across trials on RT tasks. In order to examine the generalizability across time of potential relationships between everyday problem solving and inconsistency, we examined measures of inconsistency on two separate occasions. It is possible that any relationships found between inconsistency and everyday problem solving may be a function of task novelty. Therefore, examining two separate occasions demonstrates whether the patterns obtained are maintained across time.

METHOD

Participants

A total of 304 older adults (208 women and 96 men), ranging in age from 64 to 92 (M = 74.02, SD = 5.95), participated in the present study. Participants were categorized into two age groups: young–old (n = 170,

$M = 69.67$ years, $SD = 2.74$, range 64–74) and old–old ($n = 134$, $M = 79.54$ years, $SD = 4.02$, range 75–92). All participants were Caucasian.

Participants were also categorized on the basis of cognitive status, which ranged from cognitively intact to mildly impaired but not yet demented. Although researchers agree that there are important intermediate states along a continuum of cognitive functioning between normal, healthy cognition and dementia, there is no consensus with respect to the criteria used to define these states or the terms used to denote them (Palmer, Fratiglioni, & Winblad, 2003; Tuokko & Frerichs, 2000). Some of the most commonly used terms have included Age-Associated Cognitive Decline (Levy, 1994), Mild Cognitive Impairment (Petersen et al., 2001), and Mild Neurocognitive Disorder (American Psychological Association, 2000), all of which are associated with varying inclusion and exclusion criteria (Collie & Maruff, 2002). For example, definitions differ in terms of the requirement for a memory deficit (e.g., Petersen et al., 2001) versus the presence of impairment in other cognitive domains (e.g., American Psychological Association, 2000, Mild Neurocognitive Disorder). Requirements for self-reported cognitive impairment and impairments in activities of daily living also differ amongst the various labels, with impaired daily living required for a diagnosis of Mild Neurocognitive Disorder, but not for Mild Cognitive Impairment. In light of this lack of consensus, we have chosen to use the term Cognitively Impaired, No Dementia (CIND), which is a more general, inclusive term that encompasses many of these various definitions (Tuokko & Frerichs, 2000).

Classifying the participants on the basis of cognitive status is ideally done using norms from a set of reference cognitive tasks obtained from a separate sample. Normative data were available on five cognitive measures (perceptual speed – WAIS-R Digit Symbol Substitution, Wechsler, 1981; inductive reasoning – Letter Series, Thurstone, 1962; episodic memory – immediate free word recall, Hultsch, Hertzog, & Dixon, 1990; verbal fluency – Controlled Associations, Ekstrom, French, Harman, & Dermen, 1976; and vocabulary – Extended Range Vocabulary, Ekstrom et al., 1976) from an independent sample of 445 adults aged 65–94 years recruited from the same population through the Victoria Longitudinal Study (Dixon & de Frias, 2004).[1] Although published norms are available for most of these measures, they derive from a variety of different samples with varying demographic characteristics. The use of local norms derived for all tasks on the same population is preferred given the close demographic match to the current sample and the ability to make more accurate comparisons across tasks.

[1] Data on all 445 participants were available for the measures of perceptual speed, reasoning, verbal fluency, and vocabulary, but, due to implementation of a counterbalancing procedure, information on the episodic memory task was only available for 194 of the 445 participants of the normative sample.

The normative sample was partitioned into four age by education groups (age = 65–74 years and 75+ years; education = 0–12 years and 13+ years). Means and standard deviations were computed for these groups for the five measures and these normative values were used to classify participants from the present sample on the basis of cognitive status. We used a relatively liberal definition of CIND based on criteria adapted from Levy (1994); specifically, participants were classified as possible CIND if they obtained scores more than 1.0 *SD* below the mean of their age- and education-matched peers from the normative sample on the cognitive reference tasks. Using this basic definition, three cognitive status groups were identified. Participants were classified as CIND-Single (CIND-S, $n = 88$) if they scored more than 1.0 *SD* below their normative peers on one of the five cognitive reference tasks. Participants were classified as CIND-Multiple (CIND-M, $n = 80$) if they scored more than 1.0 *SD* below their normative peers on two or more of the five cognitive reference tasks. The remaining participants ($N = 136$) were classified as not cognitively impaired (NCI).

Exclusionary criteria for all groups included a diagnosis of dementia by their physician or a Mini Mental Status Examination (MMSE; Folstein, Folstein, & McHugh, 1975) less than 24, a history of significant head injury (defined as loss of consciousness for more than five minutes), other neurological or major medical illnesses (e.g., heart disease, cancer, Parkinson's disease), severe sensory impairment, extensive drug or alcohol abuse, current psychiatric diagnoses, or psychotropic drug usage. All participants resided in the community and were recruited through local media (newspaper and radio advertisements).

During an initial intake interview, demographic information, self-reported health information, and benchmark cognitive measures were obtained including the Wechsler Adult Intelligence Scale-III (WAIS-III) Block Design and Vocabulary subtests (Psychological Corporation, 1997) and the North American Adult Reading Test (NAART, Blair & Spreen, 1989). Estimates of current general intellectual status (full-scale IQ or FSIQ) were computed based on the age-adjusted Block Design and Vocabulary subtest scaled-scores (Sattler & Ryan, 1999), and estimates of premorbid intellectual status were based on the NAART (Blair & Spreen, 1989). Participants were also asked to rate their level of difficulty with 5 basic activities of daily living (ADLs; walking across a room, bathing self, dressing self, getting up from a bed or chair, climbing stairs) and 4 IADLs (walking several blocks, managing finances, performing household activities, driving a car), on a scale of 0–2, ranging from no difficulty, to some difficulty, and finally to a lot of difficulty. A total score was obtained by summing participants' responses across the 9 activities, resulting in higher scores indicating greater difficulties with ADLs/IADLs.

Table 1 shows the age, education, self-reported health, and benchmark cognitive status of the participants as a function of age and cognitive status.

TABLE 1. Demographic Characteristics as a Function of Age and Cognitive Status

	NCI		CIND-S		CIND-M	
	Young–Old ($n = 75$)	Old–Old ($n = 61$)	Young–Old ($n = 54$)	Old–Old ($n = 34$)	Young–Old ($n = 41$)	Old–Old ($n = 39$)
Age						
M	69.24	78.31	69.83	79.97	70.24	81.08
SD	2.80	2.94	2.72	4.34	2.59	4.64
Education (years)						
M	16.24	14.79	15.43	14.91	15.12	13.51
SD	2.85	3.14	3.15	3.01	2.95	3.33
Self-Report ADLs/IADLs						
M	9.71	11.05	9.80	10.68	10.27	12.44
SD	1.46	2.58	1.61	2.00	2.20	3.16
MMSE						
M	29.28	28.72	28.94	28.41	28.73	27.80
SD	0.80	1.23	0.94	1.33	1.32	1.47
WAIS-III Block Design[a]						
M	13.32	13.26	12.22	11.41	10.76	10.44
SD	2.65	3.07	2.77	2.19	1.77	2.63
WAIS-III Vocabulary[a]						
M	15.44	15.61	14.65	14.59	13.66	12.44
SD	1.98	2.24	2.48	2.91	2.74	2.33
WAIS-III Estimated FSIQ						
M	125.29	125.61	119.83	117.27	112.78	108.31
SD	10.66	11.64	11.06	12.16	10.65	10.08
NAART errors						
M	10.65	12.67	15.74	13.53	16.12	22.41
SD	6.23	5.87	7.74	9.28	9.53	10.37
Estimated NAART IQ						
M	119.49	117.92	115.52	117.25	115.23	110.32
SD	4.86	4.58	6.04	7.24	7.43	8.09

Note: [a]WAIS-III Age-Scaled Scores.

Group differences in age were examined as a function of cognitive status using a one-way ANOVA. In addition, 2 (young–old, old–old) by 3 (NCI, CIND-S, CIND-M) between subjects ANOVAs were conducted for all of the remaining descriptive variables. Significant Cognitive Status main effects were observed for Age: $F(2, 301) = 3.69$, $p = .026$; Education: $F(2, 298) = 3.87$, $p = .022$; Self-Reported ADLs/IADLs: $F(2, 298) = 6.69$, $p = .001$; MMSE: $F(2, 298) = 10.34$, $p < .001$; WAIS-III Block Design: $F(2, 298) = 27.62$, $p < .001$; WAIS-III Vocabulary: $F(2, 298) = 26.91$, $p < .001$; WAIS-III Estimated Full-Scale IQ: $F(2, 298) = 46.19$, $p < .001$; number of errors made on the NAART: $F(2, 298) = 23.14$, $p < .001$; and NAART Estimated IQ: $F(2, 298) = 23.14$, $p < .001$. Significant Age Group main effects emerged for Education: $F(1, 298) = 10.72$, $p = .001$; Self-Reported ADLs/IADLs: $F(1, 298) = 32.13$; $p < .001$; MMSE: $F(1, 298) = 24.31$, $p < .001$; number of errors made on the NAART: $F(1, 298) = 4.64$, $p = .032$; and NAART Estimated IQ: $F(1, 298) = 4.64$, $p = .032$. Significant Age Group × Cognitive Status interactions were observed for number of errors made on the NAART: $F(2, 298) = 5.88$, $p = .003$ and NAART Estimated IQ: $F(2, 298) = 5.88$, $p = .003$.

Post-hoc contrasts using Tukey's HSD for unequal N's ($p < .05$) and one-way ANOVAs indicated that the NCI group was younger and more highly educated than the CIND-M group. The NCI and CIND-S groups reported better IADL functioning and obtained higher scores on the MMSE than the CIND-M group. For WAIS-III Block Design, WAIS-III Vocabulary, and WAIS-III Estimated Full-Scale IQ, all three groups differed significantly from one another with the NCI group demonstrating the highest intellectual abilities and the CIND-M group demonstrating the lowest. The Young–Old group was more highly educated, reported better IADL functioning, and obtained higher scores on the MMSE than the Old–Old group. With respect to the number of errors made on the NAART and the NAART Estimated IQ, the NCI group performed better than the CIND-M, regardless of age. However, the NCI group outperformed the CIND-S group on the NAART only for the Young–Old participants; that is, the Old–Old NCI group did not differ significantly from the Old–Old CIND-S group.

Procedure

Potential participants were initially screened for inclusion and exclusion criteria by a telephone interview. Individuals identified as potential participants then attended a group testing session to assess multiple aspects of cognitive functioning using the five indicators of perceptual speed, reasoning, episodic memory, verbal fluency, and vocabulary.

Following the group testing session, participants provided information about demographic characteristics, self-ratings of health, and medication use during an individual intake interview. Following the intake interview, participants were assessed on 5 separate sessions by a team of research assistants who were trained to administer the battery of tests. Participants were tested bi-weekly in their homes and, on each session, were administered a battery of cognitive tasks (e.g., RT, episodic memory) and state-like indicators of physical (e.g., gait, blood pressure, respiratory functioning) and emotional functioning (e.g., stress, affect). Participants were given the EPT in a final test session. For the purposes of the present study, only findings pertaining to the RT tasks and EPT will be discussed.

Measures

The Everyday Problems Test (EPT)

The EPT (Willis & Marsiske, 1993) is a paper and pencil measure of everyday cognitive competence that requires participants to solve problems associated with daily living. Participants are provided with 21 printed stimulus materials (e.g., medication label, pay phone information) and asked to solve two problems pertaining to each stimulus. All stimuli are reproductions of real-life materials with four to six items representing one of the following IADL domains: medication use, meal preparation, telephone use, shopping, financial management, household management and transportation. For example, with respect to meal preparation, participants are provided with a nutritional information chart for cereal and are asked to determine how many calories are in a serving of cereal if whole milk is used instead of skim milk. For a question in the transportation domain, participants are provided with a chart of taxi rates and are asked to determine how much they would have to pay if they traveled 1 mile in a suburban area. The original EPT consists of 42 items; however, for the purposes of the present study, items # 10 (Medicare Benefits Payment Schedule) and 12 (Stain Removal Directions) were omitted because a significant minority of participants disputed interpretation of elements of the problems. Consequently, possible scores ranged from 0 to 40, with higher scores indicating better performance. Willis and Marsiske (1993) reported a one-year test–retest reliability of .93. The internal consistency (Cronbach's alpha) for the EPT for the current study was .88. With respect to validity, the EPT has been found to significantly correlate with direct observation of older adults' performance of everyday tasks involving medications, meal preparation, and phone usage (r = .67). Correlations with older adults' self-reports (r = .23) and dementia patients' self-reports (r = .36) of IADL functioning were also significant, but lower (Willis et al., 1998; Willis & Marsiske, 1993). This is to be expected given that performance-based and self-report measures tap somewhat different aspects of functioning and that different assessment methods provide different estimates of an individual's ability to perform IADLs (e.g., Loewenstein et al., 2001; Myers, Holliday, Harvey, & Hutchinson, 1993).

Measures of Inconsistency

Inconsistency in RT was measured on four tasks: finger tapping, simple RT, choice RT, and one-back RT. All of the tasks were administered on a laptop computer. The instructions emphasized speed of performance. Tasks were administered in a constant order across the five sessions. Hultsch et al. (2000) reported that latency was a more sensitive indicator of intraindividual variability than accuracy; therefore, for the purpose of the present study, only measures of latency (including correct and incorrect trials) were analyzed.

Finger Tapping (Tap Dominant, Tap Nondominant)

Participants were instructed to press the 'Left' key with their left hands as quickly as possible. With each tap, a letter 'L' appeared on the screen and participants were asked to continue tapping until they completed a practice row of L's (24 taps) followed by the test trial with two rows of Ls (i.e., 48 taps). They were then asked to repeat the same procedure using their right hands with the 'Right' key. For each hand, the measures used were the latencies between the taps.

Simple Reaction Time (SRT)

Participants were presented with a warning stimulus (cross) followed by a signal stimulus (box) in the middle of the screen. Participants were instructed to press a key with the index finger of their dominant hand as quickly as possible when the signal stimulus appeared. A total of 5 practice trials followed by 50 test trials were administered. Ten randomly arranged trials were presented at each of five intervals separating the warning and signal stimuli (500, 625, 750, 875 and 1000 ms). The measures used were the latencies of the 50 test trials.

Choicer Reaction Time (CRT)

Participants received a warning signal consisting of four crosses positioned horizontally (+ + + +) on the screen. After a delay of 250 ms, one of the crosses changed into a square. The location of the square was randomly equalized across trials. Participants were instructed to press a key on a response keyboard corresponding to the location of the square as quickly as possible, using separate fingers (i.e., two fingers from left hand and two fingers from right hand) for each button. A total of 10 practice trials followed by 60 test trials were administered. The measures used were the latencies for the 60 test trials.

One-Back Reaction Time (BRT)

The BRT task was similar to CRT except that participants were instructed to press the key on the response keyboard that matched the position of the box on the previous trial. A total of 10 practice trials followed by 60 test trials were administered. The measures used were the latencies for the 60 test trials.

Data Preparation and Statistical Analyses

To minimize error variance, outliers at the level of individual trials for each participant were removed prior to conducting statistical analyses, reducing the influence of extremely slow or fast responses (e.g., errors associated with accidental key presses or distraction of the participant). Lower limits were set as follows: SRT – 150 ms, CRT – 150 ms, BRT – 150 ms. A lower limit was not set for the finger tapping task. Upper limits were established by computing the mean and standard deviation separately for each of the three groups for each occasion and dropping any trials exceeding the mean by three or more *SDs*. The number of missing trials for the entire Persons × Trials × Occasions data matrix was small and relatively uniform across tasks (Finger tapping = 1.02%, SRT = 1.55%, CRT = .84%, BRT = 2.96%). To avoid statistical problems associated with missing data, values were imputed for the missing trials for all three groups together using a regression procedure in which missing value estimates are based on the correlations among responses across trials and occasions. Missing values were imputed by using data from all available individuals, trials, and occasions. Dropping outlier scores and imputing corresponding missing values helps to reduce error from our measure of variability and thereby increases the reliability of the variability estimate. This procedure reduces variability and therefore represents a conservative approach to examining the phenomenon.

Of the many indices that may be computed to examine inconsistency in RT (Slifkin & Newell, 1998), perhaps the simplest is the intraindividual standard deviation (ISD). Given that group differences in response speed and systematic changes across time (e.g., practice effects) represent potential confounds for the analysis of inconsistency, calculating ISDs based on raw scores is potentially problematic. Therefore, we statistically removed, or partialled, effects associated with age group, cognitive status group, trial and their interactions from the raw data prior to computing ISDs by regressing each dependent measure on these variables. The resulting residual scores were then converted to T-scores to permit comparison of the tasks in the same metric.

For the purposes of the present study, ISDs were created from all trials (i.e., both correct and incorrect trials). Past research has shown that the same pattern of results is obtained whether ISDs are created from all trials or restricted to trials from correct responses (Burton et al., 2006b). Relatively few errors were made by participants on the CRT and BRT tasks (accuracy data are not obtained for finger tapping or SRT). The mean percentage of correct responses for CRT for the NCI, CIND-S, and CIND-M groups were 98.4, 98.3 and 97.0% (Occasion 1), respectively, and 98.5, 99.3 and 98.5% (Occasion 5), respectively. For BRT, the mean percentage of correct responses were 89.4, 86.9 and 77.9% (Occasion 1), and 94.6, 92.0 and 86.8%, respectively, for the NCI, CIND-S, and CIND-M groups. In addition, only ISDs from the first and fifth testing sessions are analyzed for the purposes of the present study. Comparing the pattern of results obtained from the first session to those of the fifth session allows for an examination of the generalizability of the relationship between inconsistency and EPT performance across time. We analyzed the two sessions that were farthest apart to maximize generalizability.

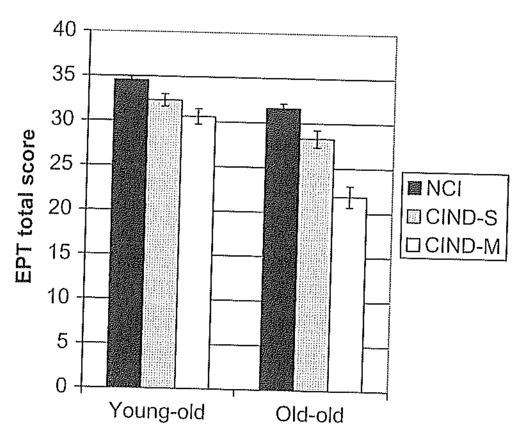
The issues of whether level of performance and inconsistency in performance on measures of RT differ as a function of age and cognitive status are addressed in a separate paper (Dixon et al., 2007). Briefly, these analyses have shown that older age and poorer cognitive status are associated with slower and more inconsistent RTs. Thus the present paper will examine inconsistency in RT for the sample as a whole.

RESULTS

Group Differences on EPT Scores

The mean score across all participants for the EPT was 30.70 ($SD = 6.39$, range = 6–40). A 2 (age) × 3 (cognitive status) between-subjects ANOVA was performed with the EPT as the dependent variable. Preliminary analyses were conducted with total years of education as a covariate. However, the pattern of results obtained was the same as when the analyses were conducted without education as a covariate. Therefore, analyses without education as a covariate are presented below. Significant main effects emerged for Age: $F(1, 298) = 73.87$, $p < .001$, partial $\eta^2 = .20$; and Cognitive status: $F(2, 298) = 45.49$, $p < .001$, partial $\eta^2 = .23$. The young–old adults obtained higher scores on the EPT than the old–old adults (young–old: $M = 32.89$, $SD = 4.89$; old–old: $M = 27.93$, $SD = 6.98$). The NCI adults ($M = 33.24$, $SD = 4.14$) outperformed the CIND-S group ($M = 30.77$, $SD = 5.64$), which in turn outperformed the CIND-M group ($M = 26.31$, $SD = 7.86$). In addition, a significant Age × Cognitive status interaction was found: $F(2, 298) = 8.37$, $p < .001$, partial $\eta^2 = .05$. *Post-hoc* analyses were conducted using one-way ANOVAs and Tukey's HSD for unequal N's. As shown in Figure 1, for the

FIGURE 1. Mean EPT total scores by age group and cognitive status.



young–old adults, the NCI group obtained significantly higher scores on the EPT than the other two groups (i.e., CIND-S and CIND-M), which did not differ: $F(2, 167) = 10.30$, $p < .001$, partial $\eta^2 = .11$. For the old–old participants, all groups differed significantly from one another on the EPT, $F(2, 131) = 35.65$, $p < .001$, partial $\eta^2 = .35$, with the NCI group obtaining the highest scores and the CIND-M group obtaining the lowest.

Relationship of EPT to Demographic Variables and RT Tasks

Pearson correlation coefficients were used to examine the relationships between the EPT and the demographic variables and RT tasks. As shown in Table 2, significant associations were found between the EPT and all of the demographic variables, indicating that better performance on the EPT is associated with younger age, more education, fewer self-reported difficulties with ADLs and IADLs, and better cognitive performance as measured by the MMSE, WAIS-III Block Design, Vocabulary, and Estimated FSIQ, and the NAART.

Table 3 shows the mean latencies and ISDs for the RT tasks for occasions 1 and 5. Bivariate associations between the EPT and (1) mean latencies and (2) ISDs for the RT tasks for occasions 1 and 5 are shown in Table 4. Significant negative associations were found between the EPT and all of the RT latencies and ISDs, indicating that better EPT performance is associated with faster latencies and more consistent performance. Most of the correlations between the EPT and the finger tapping tasks and SRT were small (i.e., $r < .30$; Cohen, 1977), whereas those for the more complex CRT and BRT tasks were all moderate in size (i.e., $r = .30$ to $.50$; Cohen, 1977).

Hierarchical Regression Analyses

The relative contributions of inconsistency and mean level of performance to the prediction of EPT scores was investigated using two hierarchical

TABLE 2. Correlations Between EPT Performance and Demographic Variables

	EPT
Age	−.43***
Education	.37***
Self-Report ADLs/IADLs	−.29***
MMSE	.37***
WAIS-III Block Design[a]	.44***
WAIS-III Vocabulary[a]	.48***
WAIS-III Estimated FSIQ	.57***
Estimated NAART IQ	.56***

Note: [a]WAIS-III Age-Scaled Scores.
***$p < .001$.

TABLE 3. Mean Latency and ISD Scores for Occasions 1 and 5

	Latencies		ISDs	
Variable	Occasion 1	Occasion 5	Occasion 1	Occasion 5
Tap dominant				
M	203.30	199.32	5.14	4.73
SD	42.02	41.03	3.30	3.01
Tap nondominant				
M	233.92	222.98	6.24	6.56
SD	55.58	46.60	3.62	3.48
SRT				
M	377.23	370.34	7.49	6.84
SD	85.25	85.60	4.24	2.32
CRT				
M	633.41	581.91	8.02	7.69
SD	120.39	100.87	2.14	2.08
BRT				
M	1740.39	1032.34	7.63	7.45
SD	719.83	456.21	3.58	3.24

Note: Mean latency scores are measured in milliseconds.

TABLE 4. Correlations Between EPT Performance and Mean Latencies and ISDs in Reaction Time

	Latency		ISDs	
	Occasion 1	Occasion 5	Occasion 1	Occasion 5
Tap dominant	−.22***	−.27***	−.22***	−.15*
Tap nondominant	−.24***	−.25***	−.17**	−.15**
SRT	−.26***	−.29***	−.40***	−.20**
CRT	−.35***	−.37***	−.34***	−.35***
BRT	−.45***	−.46***	−.48***	−.47***

*$p < .05$. **$p < .01$. ***$p < .001$.

regression analyses. In the first analysis, demographic variables previously found to be significant predictors of IADLs were entered in the first block (i.e., age group, education group) (Burton et al., 2006a; LaBuda & Lichtenberg, 1999; Marsiske & Willis, 1995). The mean latencies for all five RT tasks were entered in the second block, followed by the ISDs for all 5 tasks in the last block (see Table 5). The second model also entered the demographic variables first, but reversed the order of entry of the blocks of mean latencies and ISDs (see Table 6). As shown in Table 5 for Occasion 1 of the first model, the demographic variables accounted for the largest proportion of the variance (22.8%), with both age ($B = -2.032$; $\beta = -.158$) and education ($B = 3.789$; $\beta = .250$) making significant contributions in predicting the EPT.

TABLE 5. Hierarchical Regression Analyses for EPT Scores: Mean Latencies and ISDs

Variable	*B*	*SE B*	β	*R*	R^2	R^2 Change	Adjusted R^2
				Occasion 1			
Step 1							
Age group	−2.032**	.655	−.158				
Education group	3.789***	.696	.250				
				.478	.228	.228***	.223
Step 2							
Tap dom. latency	−.002	.012	−.010				
Tap nondom. latency	−.004	.009	−.036				
SRT latency	−.001	.004	−.009				
CRT latency	.001	.003	.027				
BRT latency	.000	.001	−.011				
				.574	.330	.102***	.314
Step 3							
Tap dom. ISD	−.201*	.099	−.104				
Tap nondom. ISD	−.032	.096	−.018				
SRT ISD	−.290***	.078	−.192				
CRT ISD	−.364*	.169	−.122				
BRT ISD	−.442**	.129	−.248				
				.646	.417	.087***	.393
				Occasion 5			
Step 1							
Age group	−2.007**	.676	−.156				
Education group	3.559***	.713	.235				
				.478	.228	.228***	.223
Step 2							
Tap dom. mean RT	−.020	.013	−.131				
Tap nondom. mean RT	.007	.011	.051				
SRT mean RT	−.003	.004	−.035				
CRT mean RT	−.002	.004	−.024				
BRT mean RT	−.001	.001	−.067				
				.581	.337	.109***	.322
Step 3							
Tap dom. ISD	.025	.108	.012				
Tap nondom. ISD	−.123	.099	−.067				
SRT ISD	−.149	.137	−.054				
CRT ISD	−.392*	.165	−.127				
BRT ISD	−.468**	.143	−.237				
				.621	.386	.048**	.360

Note: R^2 and R^2-change values are reported for each step in the analysis, but Betas are reported only for the final step.
*$p < .05$. **$p < .01$. ***$p < .001$.

The mean latencies accounted for 10.2% of unique variance, above and beyond that accounted for by demographic variables. None of the latency measures made significant unique contributions. The ISDs accounted for a further 8.7% of unique variance. With the exception of the nondominant

TABLE 6. Hierarchical Regression Analyses for EPT Scores: ISDs and Mean Latencies

Variable	*B*	*SE B*	β	*R*	R^2	R^2 Change	Adjusted R^2
				Occasion 1			
Step 1							
Age group	−2.032**	.655	−.158				
Education group	3.789***	.696	.250				
				.478	.228	.228***	.223
Step 2							
Tap dom. ISD	−.201*	.099	−.104				
Tap nondom. ISD	−.032	.096	−.018				
SRT ISD	−.290***	.078	−.192				
CRT ISD	−.364*	.169	−.122				
BRT ISD	−.442**	.129	−.248				
				.645	.416	.187***	.402
Step 3							
Tap dom. latency	−.002	.012	−.010				
Tap nondom. latency	−.004	.009	−.036				
SRT latency	−.001	.004	−.009				
CRT latency	.001	.003	.027				
BRT latency	.000	.001	−.011				
				.646	.417	.002	.393
				Occasion 5			
Step 1							
Age group	−2.007**	.676	−.156				
Education group	3.559***	.713	.235				
				.478	.228	.228***	.223
Step 2							
Tap dom. ISD	.025	.108	.012				
Tap nondom. ISD	−.123	.099	−.067				
SRT ISD	−.149	.137	−.054				
CRT ISD	−.392*	.165	−.127				
BRT ISD	−.468**	.143	−.237				
				.609	.371	.142***	.356
Step 3							
Tap dom. mean RT	−.020	.013	−.131				
Tap nondom. mean RT	.007	.011	.051				
SRT mean RT	−.003	.004	−.035				
CRT mean RT	−.002	.004	−.024				
BRT mean RT	−.001	.001	−.067				
				.621	.386	.015	.360

Note: R^2 and R^2-change values are reported for each step in the analysis, but Betas are reported only for the final step.
$^*p < .05$. $^{**}p < .01$. $^{***}p < .001$.

finger tapping task, all of the other ISD measures made unique contributions, relative to the total set of variables, in predicting EPT performance (dominant finger tapping: $B = -.201$; $\beta = -.104$; SRT: $B = -.290$; $\beta = -.192$; CRT: $B = -.364$; $\beta = -.122$; BRT: $B = -.442$; $\beta = -.248$). For Occasion 5, the mean latencies and ISD scores accounted for 10.9% and 4.8% of unique variance respectively, after having accounted for demographic variables. Again, none of the unique contributions made by the latency measures were significant. For the ISD measures, the dominant finger tapping and SRT tasks no longer made significant unique contributions, while CRT and BRT continued to predict performance (CRT: $B = -.392$; $\beta = -.127$; BRT: $B = -.468$; $\beta = -.237$).

When reversing the order of entry for the mean latencies and ISDs (see Table 6), the ISD scores continued to account for a significant proportion of the variance (Occasion 1: 18.7%; Occasion 5: 14.2%), but the mean latencies were no longer significant for either occasion. Thus, inconsistency in RT accounted for a significant proportion of the variance in EPT scores, above and beyond mean level of performance, whereas mean latencies failed to account for a significant proportion of the variance, above and beyond inconsistency.

DISCUSSION

The purpose of the present study was to examine the performance of a sample of community dwelling non-demented older adults on a measure of everyday problem solving indexing IADLs, the EPT, and to explore associations between EPT performance and inconsistency in RT.

Across the whole sample, better everyday problem solving ability was associated with younger age, more education, better self-reported ADL/IADL functioning and better cognitive functioning. In looking at group differences, the EPT appears to be sensitive to differences in age and mild impairments in cognitive functioning. The everyday problem solving ability of older adults who showed no signs of cognitive impairment (i.e., NCI) was significantly better than those showing mild signs of cognitive impairment (i.e., CIND-S, CIND-M), regardless of age. A difference in everyday problem solving between the CIND-S and CIND-M groups emerged for adults 75 years and older. Therefore, even older adults with very mild levels of cognitive impairment demonstrated poorer problem solving abilities than older adults showing no signs of cognitive impairment. However, even though the group differences in EPT performance were statistically significant, it remains to be seen whether these differences translate into clinically or functionally significant changes.

Consistent with the negative association found between age and other measures of everyday problem solving ability in past studies (Allaire & Marsiske, 1999; Denney & Pearce, 1989; Diehl et al., 1995), the present study found that the performance of old–old participants on the EPT was inferior to that of young–old participants. With respect to the EPT, Willis (1996) reported declines in EPT performance with age in a sample of healthy community dwelling older adults, with rates of decline increasing from the 60s through the 70s and 80s. Similarly, Marsiske and Willis (1995) found a negative relationship between age and EPT performance in a sample of older adults, with age accounting for 17% of the variance in EPT scores. However, Marsiske and Willis (1995) also failed to find an association between age and two other measures of everyday problem solving, while Cornelius and Caspi (1987) reported that older adults outperformed younger adults on one of the same measures used by Marsiske and Willis (1995).

Thus, it appears as though a negative relationship is consistently found between age and everyday problem solving when measured by the EPT, but that the relationship is less clear when other measures of everyday problem solving ability are used. As Marsiske and Willis (1995) and Allaire and Marsiske (1999) have suggested, the relationship between everyday problem solving and age is likely to depend on the measures used, the specific content areas of the task, as well as the particular cognitive demands of the task. Additionally, large individual differences observed in the rates of decline in everyday problem solving associated with aging (Willis et al., 1992) may also serve to obscure results across studies. Therefore, it is important to bear in mind that the present results are based on cross-sectional analyses only and that longitudinal analyses are needed to more fully elucidate the relationship between age and everyday problem solving.

Turning to the second question, we found that both mean level of performance in RT and inconsistency across trials in RT were significantly associated with EPT performance. Bivariate correlations indicated that slower RTs and greater variability were related to poorer performance on the EPT. However, given previously found relationships between inconsistency and level of performance on various cognitive tasks (Hultsch et al., 2000; Li et al., 2001; Rabbitt et al., 2001), the possibility arises that the relationship between inconsistency and everyday problem solving is mediated by level of performance. In other words, was a relationship found between inconsistency and everyday problem solving because both are related to mean latency in RT? To investigate this possibility, the mean latencies for all of the RT tasks were entered together as a block in a hierarchical regression analysis, followed by the ISD scores together in a block. After controlling for age and education, which accounted for approximately 23% of the variance, the mean latencies for all of the RT tasks together accounted for approximately 10% of the variance for both Occasions 1 and 5. None of the individual latency measures made a significant unique contribution to prediction relative to the total set of latency measures. The measures of inconsistency continued to account for a significant proportion of the variance in the EPT, even after accounting for age, education, and mean level of performance. The measures of inconsistency obtained from Occasion 1 accounted for almost 9% of the variance, with all of the inconsistency measures, except for nondominant finger tapping, uniquely contributing to the prediction of EPT performance. For the ISDs from Occasion 5, the measures of inconsistency still accounted for almost 5% of unique variance in EPT scores, with CRT and BRT making significant unique contributions. Thus, inconsistency in RT contributes useful information in predicting everyday problem solving in the domain of IADLs above and beyond that provided by mean level of performance. Additionally, it is important to note that although the proportion of variance accounted for by inconsistency in RT is somewhat attenuated in the final occasion in comparison to the first occasion, significant effects were still obtained even after previous exposure to the tasks. Thus, the relationship between inconsistency and everyday problem solving appears to generalize across time and is not simply a function of task novelty.

We also examined whether mean latencies would predict EPT performance over and above inconsistency. In these analyses, inconsistency accounted for 18.7% and 14.2% for Occasions 1 and 5, respectively, of the variance in EPT scores, but the mean latencies failed to make a significant contribution. Thus, it appears that inconsistency in RT has unique predictive power whereas mean latencies do not.

Rabbitt et al. (2001) has examined the relationship between inconsistency and a more traditional laboratory measure of intelligence, the Culture Fair intelligence test. They showed that inconsistency on choice RT tasks was significantly and negatively correlated with older adults' performance on the Culture Fair intelligence test, such that greater inconsistency is associated with lower intelligence scores. Thus, it appears as though inconsistency in cognitive functioning may be related to both traditional measures of intelligence and more ecologically valid measures of problem solving on everyday activities. However, Rabbitt et al. (2001) did not examine whether inconsistency predicted intelligence scores over and above mean level of performance. In contrast, Hultsch et al. (2002) did examine the unique contributions of both inconsistency and mean latencies in RT in predicting performance on measures of perceptual speed, working memory, episodic memory, and crystallized abilities. They found that inconsistency on measures of RT uniquely accounted for 11–20% of the variance in cognitive performance over and above mean-level influences.

The observed link between inconsistency and older adults' ability to solve cognitively complex everyday problems raises the question of possible practical implications. Although possible clinical implications of inconsistency in cognitive performance are evident, it is not yet clear whether inconsistency is of any functional importance. For example, from a clinical perspective, the question arises whether fluctuations in cognitive performance are sufficiently large that a person is diagnosed as impaired one day, but within the normal range of cognitive functioning on another day (Hultsch et al., 2000)? Further, does inconsistency in cognitive performance affect an older adult's ability to function in everyday life? The findings from this study address this second question and tentatively suggest that inconsistency in cognitive functioning may in fact be of functional relevance. The observed link between inconsistency in RT and everyday problem solving in this cross-sectional sample also raises the question of whether inconsistency predicts declines in everyday problem solving or instrumental activities of daily living. The findings from this study originate from the first year of a four-year longitudinal study. Thus, our future work will address whether inconsistency contributes useful information in predicting declines in functional abilities and problem solving on everyday tasks.

The present study focused specifically on mean level of performance and inconsistency on RT tasks. Past research has shown that the ability to solve cognitively complex everyday tasks is influenced by various other cognitive abilities as well, such as memory, executive functioning, and language abilities (e.g., Allaire & Marsiske, 1999; Bertrand et al., 2001; Burton et al., 2006a). Thus, an area for further investigation is to examine whether inconsistency also makes a unique contribution in predicting everyday problem solving over and above other cognitive abilities. That is, after accounting for other cognitive abilities that have been found to be important determinants of performance on everyday tasks, such as memory, visuospatial abilities, language, and executive functioning, is inconsistency of any additional predictive utility? These findings will also be relevant in evaluating how useful inconsistency is in predicting everyday problem solving.

Although the results from the present study suggest a promising relationship between inconsistency and everyday problem solving, there are a number of limitations to consider. Participants were not randomly sampled from the community, resulting in a well-educated and almost exclusively Caucasian sample, and thus limiting the generalizability of the present results. Because these findings represent one of the first attempts at examining the relationship between inconsistency and everyday problem solving, it will be interesting to see if these results are replicated using other samples and other measures of everyday problem solving. It is possible that even stronger associations between inconsistency and everyday problem solving may have been obtained if a more varied sample had been used. Also, given that the measure of everyday functioning used in the present study represents a narrow view, other performance-based or observational measures of everyday functioning should also be examined. Thus, while the EPT correlates moderately well with observed and self-report IADL functioning (Willis et al., 1998; Willis & Marsiske, 1993), it is important to bear in mind that the EPT is not a direct measure of functional capacity. Our findings likely provide a gross estimate of an older adult's actual performance in the natural environment.

In summary, the present findings suggest that declines in everyday problem solving are observed with increased age and even very mild levels of cognitive impairment. Both level of performance and across-trial inconsistency on RT tasks were found to be important predictors of older adults' ability to solve cognitive complex tasks indexing IADLs. Of note, even after accounting for level of performance, inconsistency continued to make a significant and unique contribution in predicting everyday problem solving. Future research will be essential in further determining the functional relevance of inconsistency in cognitive functioning.

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