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| **Domain:** | Substance Use-related Neurobehavioral and Cognitive Risk Factors |
| **Measure:** | Motor and Attentional Impulsivity (Immediate and Delayed Memory Task) |
| **Definition:** | This measure requires and assesses sustained attention; it also assesses motor impulsivity as responding before complete evaluation of the stimuli. |
| **Purpose:** | Failure to inhibit commission errors to non-target stimuli is a component of impulsivity and is a risk factor for substance use disorders. |
| **Essential PhenX Measures:** | Current Age |
| **Related PhenX Measures:** | Working Memory Cognitive Flexibility (Dimensional Change Card Sort) Response Inhibition (Go/NoGo Task) |
| **Collections:** | Impulsivity Substance Use-related Neurobehavioral and Cognitive Risk Factors SCD Neurology, Quality of Life, and Health Services Additional Relevant Measures |
| **Keywords:** | Adolescent, Adult, Continuous performance task, Delayed Memory Task, Immediate Memory Task, Impulsivity, Response initiation, Substance abuse, Substance use, Sustained attention, SAA, Substance Use-related Neurobehavioral and Cognitive Risk Factors, computer administered |

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| **Protocol Release Date:** | February 24, 2012 |
| **PhenX Protocol Name:** | Motor and Attentional Impulsivity (Immediate and Delayed Memory Task) |
| **Protocol Name from Source:** | The Expert Review Panel has not reviewed this measure yet. |
| **Description:** | The Immediate and Delayed Memory Task (IMT/DMT) is a computer-based test where participants selectively and rapidly respond to a series of visual stimuli. The Immediate and Delayed Memory Task tracks both commission errors (motor impulsivity), which are responses to incorrect stimuli, and omission errors (attentional impulsivity), which are nonresponses to correct stimuli.  For more information about the Immediate Memory Task, please refer to the [link[www.cognitiveatlas.org/task/id/trm\_4fba857ad04ac|Cognitive Atlas Interpretation]].  For more information about the Delayed Memory Task, please refer to the [link[www.cognitiveatlas.org/task/id/trm\_4fba85a597ca9|Cognitive Atlas Interpretation]]. |
| **Specific Instructions:** | This Task is proprietary and can be obtained by submitting the software request form found on the "Development of Software" page of the Neurobehavioral Research Laboratory and Clinic website (University of Texas Health Science Center at San Antonio). |
| **Protocol:** | **Summary of the Immediate and Delayed Memory Task (IMT/DMT)**  In the Immediate Memory Task, a series of randomly generated numbers (the default is 5-digit numbers (e.g., 38391)), appear on a computer monitor one at a time for 500 milliseconds (msec) each with a 500 msec delay between numbers. The participant is instructed to respond when two identical numbers are presented in sequence. The three main types of stimuli are target, filler, and catch stimuli. A target stimulus is a 5-digit number that is identical to the preceding number. Responses to target stimuli are recorded as correct detections. A catch stimulus is a number that differs from the preceding number by only one digit (position and value determined randomly). Responses to catch stimuli are recorded as commission errors. A filler stimulus is a random 5-digit number that appears whenever a target or catch trial is not scheduled to appear. Responses to filler stimuli are recorded as filler errors.  The Delayed Memory Task adds a series of distracter numbers ("12345" by default) between each stimulus to be compared to the previous in the series. Participants are instructed to ignore these distracter sequences, but the presentation of these sequences increases the length of time between two target stimuli and evokes a greater working-memory component to the task, similar to the N-back task.  The experimenter can set the software to collect either the IMT or the DMT or both (default), in a contiguous task session.  **Scoring**  The IMT/DMT software generates a summary report for each session that includes: 1) rates of correct detections (and therefore rates of omission errors) 2) rates of commission error responses to catch stimuli, 3) rates of filler errors, 4) parametric and non-parametric indices or stimulus discriminability, and 5) parametric and non-parametric indices of response bias (i.e. liberal or conservative response behavior). A higher number of commission errors indicates an impulsive pattern of responding.  This program can be found at [www.nrlc-group.net/software/software.php](http://www.nrlc-group.net/software/software.php) |
| **Selection Rationale:** | The Immediate and Delayed Memory Task is a widely used, validated, and nonproprietary version of the continuous performance test for response initiation. |
| **Source:** | This Task is proprietary. Investigators can obtain the Immediate Memory Task by submitting the software request form found on the "Development of Software" page of the Neurobehavioral Research Laboratory and Clinic website (University of Texas Health Science Center at San Antonio). |
| **Life Stage:** | Adolescent Adult |
| **Language of source:** | English |
| **Participant:** | Adolescents and adults aged 13 years or older |
| **Personnel and Training Required:** | The Immediate Memory Task can be administered by research assistants trained in the ethical and competent use of psychological tests. |
| **Equipment Needs:** | The Immediate Memory Task can be installed on computers running Windows 2000/XP. |
| **Standards:** | |  |  |  |  | | --- | --- | --- | --- | | **Standard** | **Name** | **ID** | **Source** | | Common Data Element (CDE) | Neurobehavioral Impulsivity Questionnaire Assessment Score | 3371884 | [CDE Browser](https://cdebrowser.nci.nih.gov/CDEBrowser/search?elementDetails=9&FirstTimer=0&PageId=ElementDetailsGroup&publicId=3371884&version=1.0) | |
| **General references:** | Dougherty, D. M., Bjork, J. M., Harper, R. A., Mathias, C. W., Moeller, F. G., & Marsh, D. M. (2003). Validation of the Immediate and Delayed Memory Tasks in hospitalized adolescents with disruptive behavior disorders. *Psychological Record*, *53*, 509-532.  Dougherty, D. M., & Marsh, D. M. (2003). *Immediate and Delayed Memory Tasks (IMT/DMT 2.0): A research tool for studying attention, memory, and impulsive behavior.* Houston, TX: Neurobehavioral Research Laboratory and Clinic, University of Texas Health Science Center at Houston.  Dougherty, D. M., Marsh, D. M., & Mathias, C. W. (2002). Immediate and Delayed Memory Tasks: A computerized behavioral measure of memory, attention, and impulsivity. *Behavioral Research Methods: Instruments and Computers*, *34*, 391-398.  Liu, S., Lane, S.D., Schmitz, J.M., Waters, A.J., Cunnigham, K.A., & Moeller, G.F. (2011). Relationship between attentional bias to cocaine-related stimuli and impulsivity in cocaine-dependent subjects. *The American Journal of Drug and Alcohol Abuse, 37*, 117-122.  Mathias, C. W., Marsh, D. M., & Dougherty, D. M. (2002). Reliability estimates for the Immediate and Delayed Memory Tasks. *Perceptual and Motor Skills*, *95*, 559-569. |
| **Mode of Administration:** | Self-administered evaluation |
| **Derived Variables:** | None |
| **Requirements:** | |  |  | | --- | --- | | **Requirement Category** | **Required** | | Major equipment | No | | Specialized training | No | | Specialized requirements for biospecimen collection | No | | Average time of greater than 15 minutes in an unaffected individual | No | |
| **Process and Review:** | The Expert Review Panel has not reviewed this measure yet. |