Mean Sex Differences in Psychomotor Ability: A Meta-Analysis

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ABSTRACT

Psychomotor tests measure the ability to manipulate and control objects. They are used in personnel selection for various occupations. Based on 287,374 observations and 410 effect sizes, this paper reviews and summarizes sex differences in ten general categories of psychomotor tests and 36 sub-categories.

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Psychomotor tests assess the ability to manipulate and control objects and include tasks and abilities such as: aiming and tracking; manipulation of objects, tools and controls; reacting to stimuli; and making quick, accurate movements. Tests of psychomotor abilities were incorporated into the General Aptitude Test Battery (GATB) over 60 years ago (Baydoun & Neuman, 1992). Psychomotor tests have been used in selection and assessment in a number of different occupations such as military pilots (Carretta, 1997), other military personnel, mechanics, vehicle and equipment operators (Inskeep, 1971), and surgery residents (Thorson, Kelly, Forse, & Turaga, 2011).

Research concerning sex differences on psychomotor tests has presented mixed results. Russell, Katkowski, Le, and Rosse (2005) reported a large difference (d = 1.06) on a psychomotor composite, favoring men. In a study of U.S. Air Force pilots, Caretta (1997) also found gender differences on psychomotor ability, favoring men. Other studies of military and aviation jobs showed consistent, small gender differences favoring men. More recently, sex differences in psychomotor skills have been a topic of research in medicine given the growth of medical simulators (Shane, Pettitt, Morgenthal, & Smith, 2008; Thorson et al., 2011). Thorson et al. (2011) assessed psychomotor abilities in fourth year medical school students using a surgery simulator. Women performed consistently worse than men, both in time taken to perform the task, and in errors. Thorson et al. noted that similar results have been found in other hand-eye coordination tests. This finding is counter to many studies showing that women often do well on tests related to steadiness and fine motor ability. Studies of hand steadiness across multiple age groups have shown a female advantage (Briggs & Tellegen, 1971; Brito & Santos-Morales, 2002; Ruffer, 1984). Other studies examining gender differences on small hand movements such as making fast, accurate marks on a piece of paper (Peters & Servos, 1989), or assembling small parts (Brito & Santos-Morales, 2002), report results favoring women.

This descriptive study examines sex differences in psychomotor measures using a taxonomy largely based on the work of Fleishman and colleagues (1964; 1984). Given that past literature suggests that sex differences vary in direction and magnitude based on the measure used, we present findings separately by type of psychomotor measure. To our knowledge, our paper is the first quantitative review of sex differences in psychomotor tests.

Method

Literature Search

Our literature search included an automated PsychInfo search. This search uncovered approximately 100 studies. Because much of the psychomotor literature is conducted or sponsored by the U.S. military, we also conducted automated searches of the Defense Technical Information Center (DTIC) database. This search returned over 400 studies, including over half of the initial group of samples located through PsychInfo. We searched these databases using the terms “psychomotor” and “motor skills,” each paired with “gender” and then “sex.” In both the DTIC and Psychinfo databases, several additional searches using different terms, such as “psychomotor differences” failed to uncover new, relevant studies, while extremely broad searches, such as “psychomotor” without including “gender” or “sex,” returned too many studies to review adequately. Given that psychomotor ability sex differences in medical simulators comprise a new and emerging literature, we also conducted automated searches of Medline, a database which covers the biomedical literature. In Medline, titles and abstracts were searched, using the terms “psychomotor,” “motor skills,” “simulator,” and “surgical skills” paired with “gender” and “sex.” Additional terms were used for the Medline data base because the relevant studies in Medline focused on psychomotor sex differences in surgery and surgery simulators. This search returned nearly 750 studies. Additional studies were found by reviewing the reference sections of studies uncovered with the above searches. All searches were conducted in the spring of 2012.

Inclusion Rules and Coding

Studies were included in the analysis if they contained measures of psychomotor ability and reported results for both men and women. Studies had to involve some type of arm, hand, leg, or foot movement to be included. Some studies involving reaction time, used verbal responses, as opposed to a hand movement (Adam, 1999) and thus were excluded. Other excluded studies involved simulated object assembly, measuring perceptual skills, but no real objects were being manipulated (Newcombe, Bandura, & Taylor, 1983). We did not include gross psychomotor skills, such as those incorporated into many physical education studies, such as: basketball dribbling (Ding, Sun, & Chen, 2011), throwing, running, stretching, jumping, and grip strength (Rice, Sharp, Tharion, & Williamson, 1996). These gross motor skills were excluded in order to focus on the skills which would be most likely to apply in occupational settings. When studies did not report an effect size but did report statistical significance levels in a range ($p < .05$; e.g., Barnsley & Rabinovitch, 1970), we excluded these results because of the wide range of possible effect sizes that could be characterized as $p < .05$ (i.e., effect sizes derived from a p value of .049 are of much different magnitude those from a p value of .001). When statistical significance was reported exactly (e.g., $p = .037$) and we knew the direction of the effects (e.g., women performed better than men), we calculated an exact effect size and used the statistic in the analysis.

When samples were tested multiple times with the same measure, we used the scores on the last trial, unless authors only provided overall or composite scores. When studies included different levels of the same psychomotor test, such as varying rates of speed on a rotary pursuit task, we only included the effect size for the most difficult or cognitively demanding measure. If studies used subjects with personality, neurological, or other disorders, we only included the healthy/control samples (Dodrill, 1979; Matthews & Haaland, 1979). If studies tested the effects of a drug, or some other form of intervention on psychomotor ability, we only used the control sample (Dodrill, 1979; King, 1997). When studies included samples measured multiple times over several years, as in Droege (1967), we used the measures taken when the participants were oldest. Samples including children and adults and those made up exclusively of children were included.

Age was often a variable of interest in the included studies to determine if sex differences on psychomotor ability measures change with maturity (Briggs & Tellegen, 1971; Ruff & Parker, 1993). When age was given only as a range, we coded the middle number in this range. When studies did not include age, but indicated that the subjects were in a specific grade in school, we used the general age of children in that grade; kindergarten: 6, first grade: 7, and so on. When the study used college/university students, but did not include an average age, we used 20, assuming most college students are between the ages of 18 and 22.

When studies reported effect sizes other than mean differences, we converted these effect sizes into mean differences using Wilson’s effect size calculator (Wilson & Lipsey, 2000)

Sample and Measures

Our analysis included 287,374 observations, 118,776 subjects with 61,557 men and 57,179 women, drawn from 77 studies. The number of observations exceeds the number of subjects because analyses were conducted separately by psychomotor test category and some samples administered tests in more than one category. Our data draws on a wide range of sample membership including school children, military personnel, college students, non-military employees, surgeons, and senior citizens.

Our 10 category taxonomy generally followed that of Fleishman et al.'s (1984) taxonomy with two exceptions. We had insufficient data to examine Response Orientation and we added Motor Coordination because it is discussed frequently in the psychomotor literature. In all, we used 36 subcategories of psychomotor measures that were grouped under 10 more general categories shown in Table 1.

Insert Table 1 here

Meta-Analytic Procedures

Whereas some of our sample sizes were very small ($N < 20$), our analysis used the effect size *g* which is very similar to *d* but adjusts for a slight bias in effect sizes from small samples. Both *g* and *d* express the mean sex differences in standard deviation units and have the same interpretation. In our study, a positive *g* indicates that women score better than men. Analyses were conducted using Comprehensive Meta-Analysis software (Borenstein, Hedges, Higgins, & Rothstein, 2005). We could not use psychometric meta-analysis methods due to the relative lack of reliability data reported. The APA style manual requires a listing of all data included in the analysis. Table 2 lists each study along with individual samples within each study grouped together by measure.

Insert Table 2 here

Sensitivity Analyses

Sensitivity analyses evaluate the robustness of conclusions due to changes in data, assumptions, or analysis approaches consistent with the APA style manual guidelines for meta-analysis (American Psychological Association, 2010, pp. 36-37). Our sensitivity analyses addressed both outliers and potential publication bias.

There were two types of outliers in our data. The first type is when a distribution contained effect sizes that were outliers with respect to magnitude (e.g., most effect sizes were small in magnitude but a few were very large). The second type is when the distribution contained a few very large sample sizes but most of the samples had less extreme sample sizes. Sample size is an outlier issue because mean effect sizes are weighted, in part, as a function of sample size. When distributions contained outliers, the distribution was analyzed with and without outliers.

Publication bias exists when the studies available for a review are systematically different from all studies. Often, data from small sample studies with statistically insignificant effect sizes are missing from the literature that is readily available. We conducted the following publication bias analyses: Trim and Fill (Duval, 2005), Begg and Mazumdar's rank order correlation test (Begg & Mazumdar, 1994), and Egger's test of the intercept (Egger, Smith, Schneider, & Minder, 1997). Kepes, Banks, McDaniel, & Whetzel (2012) described these methods in the context of organizational research. Consistent with the recommendations of Kepes et al., we did not report publication bias analyses for distributions with fewer than ten samples. Because the publication bias analyses can yield distorted results in the presence of moderators, we did not interpret publication bias results for the general measures in the presence of moderators.

Results

Table 3 shows the results by our general measure taxonomy. Measures that favored men were Speed of Limb Movement, Wrist-Finger Speed, Control Precision, Aiming, Multi-limb Coordination, and Reaction Time. Measures that favored women were Motor Coordination, Finger Dexterity, Steadiness, and Manual Dexterity.

Insert Table 3 here

We examined the potential moderators for each of the 10 taxa. The moderators were: specific measure (e.g., two-plate tapping is one of two specific measures in the general category of Speed of Limb Movement), age group, and article field (i.e., category of article). Our article field categories were military, medical, and all others. We initially evaluated the potential moderators by including all simultaneously in a meta-regression. The statistically significant moderators were included in categorical subgroup moderator analyses shown in Tables 4 through 9. The categorical subgroup analyses display the mean effects by moderator subgroup. We also evaluated the distributions with and without outliers using the subgroup analyses. There are no categorical subgroup analyses for Aiming and Multi-limb Coordination due to the limited number of samples. No moderator analyses are presented for Control Precision and Steadiness because no moderators were evident in the meta-regression.

Speed of Limb Movement

Speed of Limb Movement measures slightly favored men (Table 4; *g* = -0.055). Meta-regression uncovered statistically significant differences by the specific measure used and by the age group of the sample, but not by article field. An analysis of the specific measures broken into the different age groups shows that men performed faster on forearm tapping than women. Young women performed faster on two-plate tapping than men, but when adults were measured, men performed faster. The last conclusion is based on a small amount of data and is thus tentative.

Given the moderators, we did not interpret the publication bias results for the general measure of Speed of Limb Movement because the publication bias analyses can be distorted by moderator variance. There was some evidence of publication bias in the two-plate tapping measures but it does not change the conclusion that females perform better than males. However, the female advantage is not present in older samples (i.e., sample members were older) where males are favored. Given that relatively small number of samples and small *N* in the moderator subgroups coupled with some evidence of publication bias in some distributions (i.e., two-plate tapping, two age subgroups), we recommend that a conclusion of male advantage in Speed of Limb movement be judged tentative pending future data and reanalysis.

Insert Table 4 here

Wrist-Finger Speed

Wrist-Finger Speed strongly favored men (Table 5; *g* = -0.634). Meta-regression uncovered significant differences by the age group of the sample, but not by article field or the specific measure used. Men performed faster on both hand and finger tapping measures with increasing age. There appears to be no publication bias in Wrist-Finger Speed distributions.

Insert Table 5 here

Control Precision

Control Precision favored men (Table 6; *g* = -0.423). Neither meta-regression nor categorical moderator subgroup analyses were evaluated, due to the limited number of samples (*k* = 12). We also did not consider analyses with and without sample size outliers, again due to the small *k*. Publication bias does not appear to influence the results.

Aiming

Aiming strongly favored men (Table 3; *g* = -.737). Given that there were only two samples, we recommend that our conclusion be reevaluated as more data accumulate.

Steadiness

Steadiness favored women (Table 3; *g* = 0.485). Meta-regression, used to test for moderators, did not uncover significant differences among specific measures, age groups, or article field. Outlier analyses (available from the first author) did not alter the conclusion that Steadiness favored women. Results did not appear to be affected by publication bias (available from the first author).

Multi-limb Coordination

Multi-limb Coordination strongly favored males (Table 3; *g* = -1.227). Although the *g* estimate is only based on two effect sizes, the total sample size was 5,413. Still, we recommend that our conclusion that Multi-limb Coordination favors men be reevaluated as more data accumulate.

Reaction Time

Reaction Time favored men in that males have faster reaction time on average (Table 6; *g* = -0.303). Meta-regression uncovered significant differences by the specific measure used and by article field, but not for age group of the sample. Simple Reaction Time shows a stronger male advantage. Increasing the cognitive demand (using measures of choice reaction time or vigilance) reduces the reaction time sex difference. Studies from the military and medical fields show more pronounced male differences than studies from other fields. Results from outlier and publication bias analyses did not alter the conclusion that Reaction Time measures favor men.

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Insert Table 6 here

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Motor Coordination

Motor Coordination favored women (Table 7; *g* = 0.252). Meta-regression yielded significant differences by the specific measure used and by the age group of the sample, but not by article field. Samples tested on the GATB “K” Scale showed a much stronger female advantage than other specific marking measures. The female advantage is reduced with adult subjects.

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Insert Table 7 here

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Finger Dexterity

Finger Dexterity favored women (Table 8; g = 0.373). Meta-regression uncovered significant differences by the age group of the sample, but not by article field, or the specific measure used. Outlier analyses and publication bias analyses did not alter the conclusion that Finger Dexterity favored women.

Insert Table 8 here

Manual Dexterity

Manual Dexterity favored women (Table 9; g = 0.190). Meta-regression yielded significant differences by the specific measure and the age group, but not by article field. The GATB "M" scale, and the Large Peg measure yielded mean effects very close to zero, but women had a strong advantage on the two pegboard measures. The large differences by specific measure (-.025 to .550) indicate that knowledge of the specific measure used to assess Manual Dexterity is important in estimating the magnitude of sex differences. Outlier and publication bias analyses do not alter the conclusion that Manual Dexterity measures favored women.

Insert Table 9 here

Discussion

Sex differences vary in direction and magnitude by the category of psychomotor motor test and in some cases by the specific measure that assessed the category construct. Females perform better than men on Finger Dexterity, Steadiness, and Motor Coordination measures. Females also perform better than men on some measures of Manual Dexterity but there is no meaningful sex difference on other Manual Dexterity measures. All other psychomotor measures favor men with the exception of Speed of Limb movement where we advise caution in drawing conclusions. Our findings for Speed of Limb movement are complicated by forearm tapping favoring men and two-plate tapping favoring women. Also, there is possible publication bias in the two-plate tapping and there may be age moderators.

We offer that women's advantage on some psychomotor measures may be a function of smaller hand and finger size. Thus, altering equipment or objects to favor small hand and finger size is likely to increase women's scores and decrease men's scores. We speculate that some of men's advantage is due to strength. It would be ideal if equipment and objects used in job performance could be adjusted so as to favor the performance of the person using the equipment or object. This is likely possible for some performance domains but not others.

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Table 1. Psychomotor taxonomy

General Measure	Specific Measure	Description of measure
Speed of Limb Movement	Two-plate Tapping	Subject alternately strikes two plates as quickly as possible
	Forearm Tapping	Subject taps a sensor as quickly as possible, using the forearm, with only the elbow moving.
Wrist-Finger Speed	Finger Tapping	Subject taps a sensor as quickly as possible, using a finger while the arm and hand are at rest
	Hand Tapping	Subject taps a sensor as quickly as possible, using the hand, with only the wrist moving.
Control Precision	Time Sharing	While a tracking a moving target, the subject must respond to a random number flashed on the screen.
	Rotary Pursuit	The subject must keep a stylus in contact with a moving target on a turntable.
	Tracking	Subject uses a joystick or a stylus to track a moving target.
Aiming	Marksmanship	Subjects fired real weapons at targets in a range.
	Target Shoot Distance	Score represents accuracy of shots compared with targets on a screen.
Steadiness	Arm-Hand	Subject is required to keep a metal stylus from touching the sides of a small hole or the walls of a narrow maze or path.
	Gardner	(Description is the same as Arm-Hand)
Multi-limb Coordination	Two-Hand Coordination	Subject uses a control stick in each hand, one for horizontal movements and the other for vertical movements, to keep a gun-sight on a target.
	NASA Langley Complex Coordination	Subject uses hand sticks and foot pedals to activate lights in order to match a pattern of lights given as a cue.
Reaction Time	Simple	Subject responds as quickly as possible to a signal (auditory or visual).
	Choice	Similar to Simple Reaction Time, but in Choice there are two or more signals, and the subject must quickly respond to just one of them.
	Psychomotor Vigilance Task	Similar to, if not the same as, simple RT. Subject presses a button as soon as a stimulus is activated
	Target Detection Time	Similar to Target Shoot Time-to-Fire. Score is derived from the time it takes a subject to press the fire key after a target appears.
	Dynavision	Using a wall mounted board with 64 light-up buttons, subjects must press a button after it lights up and quickly respond to the next button to light up. The score is the number of correct hits in 60 seconds.
	Target Shoot Time-to-Fire	While controlling a cursor on a screen, the subject must quickly fire on a target that will appear randomly on the screen. Score on this measure reflects the time it takes for the subject to shoot after the target appears.
Motor Coordination	Marking	Subject draws, letters, symbols, or marks of some kind in a series of spaces or boxes on a piece of paper as quickly as possible.
	GATB K	I believe this description should be the same as Marking.
	Gibson Spiral Maze	Subject traces a line through a maze on a piece of paper, as quickly as possible, without touching the walls or any obstacles.
Finger Dexterity	GATB F	Similar to assembled parts, the subject puts a washer on a rivet, or removes a washer from a rivet, and repeats this process with more parts, as quickly as possible.
	Transfer	Small nails or pegs are quickly moved from 1 hole to another or from a basin to a hole using the fingers of one hand.
	Assembled Parts	Includes multiple measures with similar descriptions, all of which includes simple assembly of small parts, using both hands
	Tweezers Peg Placement	Small Pegs are moved from 1hole to another or from a small basin to a hole, using tweezers

Table 1 – Psychomotor Taxonomy Continued

General Measure	Specific Measure	Description of measure
	Beads	Subject is required to string small beads as quickly as possible
Manual Dexterity	Hand Tool Dexterity	
	Grooved Pegboard	Similar to the Purdue Pegboard, but in this measure the pegs or holes have grooves that force subjects to turn and accurately insert the pegs, with the pattern lined up.
	Large Peg Placement	Similar to other pegboard measures, but in this measure the peg has a thicker, easier to grasp top, to eliminate any advantage smaller hands might have.
	Purdue Pegboard	Subject is required to place pegs in holes as quickly as possible
	GATB M	Subject moves pegs from one part of a board with holes in it to another.
	Tactual Performance (Time)	While blindfolded, the subject must quickly place blocks into a form board .
	Kimura Task	The subject completes a series of motions, including pushing a button, pulling a lever and turning a switch, as quickly as possible.
	*Product Assembly	The measure was a timed simulation of a pharmacy order, including small containers and beads. The subject had to accurately fill the containers, with the correct type and quantity of beads.
	Cattell Pegboard	Subjects placed six pegs into corresponding holes on a board. This seems different from the other pegboards in that it is designed specifically for children.

Names of the General Measures are drawn from Fleishman et al.'s (1984) Taxonomy. The names of specific measures are often drawn from primary studies with many being combined for analysis due to similar descriptions. *Product Assembly could potentially be coded under finger dexterity.

Table 2 – List of studies

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Speed of Limb Movement	Two-plate Tapping	Briggs & Tellegen 1971 – Sample 1 – Age 4	20	0.578
		Briggs & Tellegen 1971 – Sample 2 – Age 5	20	0.143
		Briggs & Tellegen 1971 – Sample 3 – Age 6	20	0.501
		Briggs & Tellegen 1971 – Sample 4 – Age 7	20	-0.108
		Briggs & Tellegen 1971 – Sample 5 – Age 8	20	0.401
		Briggs & Tellegen 1971 – Sample 6 – Age 9	20	1.018
		Briggs & Tellegen 1971 – Sample 7 – Age 10	20	0.298
		Briggs & Tellegen 1971 – Sample 8 – Age 11	20	1.310
		Briggs & Tellegen 1971 – Sample 9 – Age 12	20	0.544
		Briggs & Tellegen 1971 – Sample 10 – Age 13	20	0.219
		Briggs & Tellegen 1971 – Sample 11 – Age 14	20	0.653
		Briggs & Tellegen 1971 – Sample 12 – Age 15	20	0.988
		Briggs & Tellegen 1971 – Sample 13 – Age 16	20	-0.289
		Briggs & Tellegen 1971 – Sample 14 – Age 17	20	-0.429
		Briggs & Tellegen 1971 – Sample 15 – Age 18	20	0.822
		Briggs & Tellegen 1971 – Sample 16 – Age 19-25	20	-0.464
		Briggs & Tellegen 1971 – Sample 17 – Age 26-32	20	-1.262
		Briggs & Tellegen 1971 – Sample 18 – Age 33-39	20	-0.322
	Forearm Tapping	Bryan 1982 – Sample 1 – Age 6	54	-0.403
		Bryan 1982 – Sample 2 – Age 7	67	-0.329
		Bryan 1982 – Sample 3 – Age 8	65	-0.640
		Bryan 1982 – Sample 4 – Age 9	79	-0.778
		Bryan 1982 – Sample 5 – Age 10	72	-0.180
		Bryan 1982 – Sample 6 – Age 11	71	-0.202
		Bryan 1982 – Sample 7 – Age 12	67	-0.109
		Bryan 1982 – Sample 8 – Age 13	68	-0.092
		Bryan 1982 – Sample 9 – Age 14	74	-0.981
		Bryan 1982 – Sample 10 – Age 15	63	-0.575
		Bryan 1982 – Sample 11 – Age 16	43	0.142
Wrist-Finger Speed	Finger Tapping	Ardila & Rosselli 1989	346	-0.577
		Bornstein 1985	365	-0.966
		Dodrill 1979	94	-0.972
		Fromm-Auch & Yeudall 1983 – Sample 1 – Age 16	32	-0.696
		Fromm-Auch & Yeudall 1983 – Sample 2 – Age 20.5	74	-0.804
		Fromm-Auch & Yeudall 1983 – Sample 3 – Age 28	56	-0.801
		Fromm-Auch & Yeudall 1983 – Sample 4 – Age 36.5	18	-1.253
		Fromm-Auch & Yeudall 1983 – Sample 5 – Age 52.5	10	-0.677
		Gunstad et al. 2007	643	-0.313
		King 1997	60	-1.005
		Krueger 1999	96	-0.731
		Morrison et al. 1979	60	-0.596
		Nygard et al 1991	137	-0.415
		Peters & Servos 1989 – Sample 1 – Right-handers	57	-1.250

Table 2 – List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Wrist-Finger Speed	Finger Tapping	Peters & Servos 1989 – Sample 2 – Left-handers	53	-0.993
		Peters & Servos 1989 – Sample 3 – Ambidextrous	65	-0.895
		Peters & Campagnaro 1996	104	-0.291
		Ruff & Parker 1993 – Sample 1	179	-0.661
		Ruff & Parker 1993 – Sample 2	89	-1.281
		Ruff & Parker 1993 – Sample 3	90	-1.296
		Schulman 1969	375	0.055
		Ylikoski et al. 1998	113	-0.772
	Hand Tapping	Bryan 1982 – Sample 1 – Age 6	54	-0.522
		Bryan 1982 – Sample 2 – Age 7	67	-0.211
		Bryan 1982 – Sample 3 – Age 8	65	-0.711
		Bryan 1982 – Sample 4 – Age 9	79	-0.671
		Bryan 1982 – Sample 5 – Age 10	72	0.000
		Bryan 1982 – Sample 6 – Age 11	71	0.022
		Bryan 1982 – Sample 7 – Age 12	67	0.000
		Bryan 1982 – Sample 8 – Age 13	68	0.034
		Bryan 1982 – Sample 9 – Age 14	74	-0.704
		Bryan 1982 – Sample 10 – Age 15	63	-0.743
		Bryan 1982 – Sample 11 – Age 16	43	-1.123
		Ruffer 1984	202	-0.726
Control Precision	Time Sharing	Carretta 1997	5353	-1.040
	Rotary Pursuit	Davol et al. 1965 – Sample 1 – Age 6	8	0.602
		Davol et al. 1965 – Sample 2 – Age 7	8	-0.239
		Davol et al. 1965 – Sample 3 – Age 8	8	0.135
		Davol et al. 1965 – Sample 4 – Age 9	8	-1.062
		Firedman et al. 1985	120	-0.636
		Piper 2011	412	-0.266
	Tracking	Fatolitis et al. 2010	73	-0.622
		Krueger 1999	96	0.527
		Larson & Alderton 1992	291	-1.377
		Russell et al. 2005	620	-0.963
		Wild & Payne 1983	80	0.639
Aiming	Marksmanship	Kemnitz et al. 1997	28	-0.676
	Target Shoot Distance	Russell et al. 2005	620	-0.740
Steadiness	Arm-Hand	Briggs & Tellegen 1971 – Sample 1 – Age 4	20	0.129
		Briggs & Tellegen 1971 – Sample 2 – Age 5	20	0.170
		Briggs & Tellegen 1971 – Sample 3 – Age 6	20	0.006
		Briggs & Tellegen 1971 – Sample 4 – Age 7	20	-0.950
		Briggs & Tellegen 1971 – Sample 5 – Age 8	20	0.573
		Briggs & Tellegen 1971 – Sample 6 – Age 9	20	0.891
		Briggs & Tellegen 1971 – Sample 7 – Age 10	20	1.174
		Briggs & Tellegen 1971 – Sample 8 – Age 11	20	1.236
		Briggs & Tellegen 1971 – Sample 9 – Age 12	20	0.067

Table 2 – List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Steadiness	Arm-Hand	Briggs & Tellegen 1971 – Sample 10 – Age 13	20	0.525
		Briggs & Tellegen 1971 – Sample 11 – Age 14	20	0.883
		Briggs & Tellegen 1971 – Sample 12 – Age 15	20	0.086
		Briggs & Tellegen 1971 – Sample 13 – Age 16	20	0.737
		Briggs & Tellegen 1971 – Sample 14 – Age 17	20	0.481
		Briggs & Tellegen 1971 – Sample 15 – Age 18	20	-0.235
		Briggs & Tellegen 1971 – Sample 16 – Age 19-25	20	0.682
		Briggs & Tellegen 1971 – Sample 17 – Age 26-32	20	0.178
		Briggs & Tellegen 1971 – Sample 18 – Age 33-39	20	0.424
		Hudgens et al. 1988	106	0.416
		Ruffer 1984	297	0.629
	Gardner	Brito & Santos-Morales 2002 – Sample 1 – Age 5.25	21	0.441
		Brito & Santos-Morales 2002 – Sample 2 – Age 5.75	19	1.494
		Brito & Santos-Morales 2002 – Sample 3 – Age 6.25	20	0.901
		Brito & Santos-Morales 2002 – Sample 4 – Age 6.75	20	1.082
		Brito & Santos-Morales 2002 – Sample 5 – Age 7.25	18	0.248
		Brito & Santos-Morales 2002 – Sample 6 – Age 7.75	22	0.245
		Brito & Santos-Morales 2002 – Sample 7 – Age 8.25	20	0.285
		Brito & Santos-Morales 2002 – Sample 8 – Age 8.75	21	0.077
		Brito & Santos-Morales 2002 – Sample 9 – Age 9.25	20	0.975
		Brito & Santos-Morales 2002 – Sample 10 – Age 9.75	19	0.914
		Brito & Santos-Morales 2002 – Sample 11 – Age 10.25	20	0.842
		Brito & Santos-Morales 2002 – Sample 12 – Age 10.75	20	1.207
		Brito & Santos-Morales 2002 – Sample 13 – Age 11.25	20	0.129
		Brito & Santos-Morales 2002 – Sample 14 – Age 11.75	20	-0.223
		Brito & Santos-Morales 2002 – Sample 15 – Age 12.5	21	0.678
		Brito & Santos-Morales 2002 – Sample 16 – Age 13.5	21	0.327
		Brito & Santos-Morales 2002 – Sample 17 – Age 15	22	-0.560
Multi-limb Coordination	Two-Hand Coordination	Caretta 1997	5,353	-1.680
	NASA Langley Complex Coordination	Key & Payne 1981	60	-0.699
Reaction Time	Simple	Bellis 1933 - Sample 1	20	-1.933
		Bellis 1933 - Sample 2	20	-2.064
		Bellis 1933 - Sample 3	20	-1.416
		Bellis 1933 – Sample 4	20	-1.808
		Bellis 1933 – Sample 5	20	-2.814
		Bellis 1933 – Sample 6	10	-0.832
		Botwinick & Thompson 1966	88	-0.408
		Eckert & Eichorn 1977	395	-0.214
		Eckert & Eichorn 1977	801	-0.160
		Fein et al. 2006	48	0.282
		Fisk et al. 1992	70	-0.907
		Henry 1961- Sample 1	60	-0.380
		Henry 1961- Sample 2	80	-0.387

Table 2 – List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Reaction Time	Simple	Henry 1961- Sample 3	100	-0.139
		Hultsch et al. 2002	862	-0.270
		Jones 2007	35	0.114
		Lock & Berger 1993	56	-0.766
		Ruffer 1984	298	-0.775
		Ruffer et al. 1985	207	-0.301
		Sifft & Khalsa 1991	60	-1.307
		Thomas & French 1985 - Sample 1	30	-0.766
		Thomas & French 1985 – Sample 2	30	-0.442
		Thomas & French 1985 – Sample 3	30	-0.612
		Thomas & French 1985 - Sample 4	30	-0.944
		Thomas & French 1985 – Sample 5	30	-0.910
	Choice	Ackerman 1992	102	-0.188
		Deary et al. 2001 – Sample 1	542	-0.148
		Deary et al. 2001 – Sample 2	709	-0.065
		Deary & Der 2005	900	-0.003
		Der & Deary 2006 – Sample 1	244	-0.262
		Der & Deary 2006 – Sample 2	264	-0.197
		Der & Deary 2006 – Sample 3	249	-0.159
		Der & Deary 2006 – Sample 4	289	-0.228
		Der & Deary 2006 – Sample 5	279	-0.227
		Der & Deary 2006 – Sample 6	249	-0.162
		Der & Deary 2006 – Sample 7	283	-0.011
		Der & Deary 2006 – Sample 8	274	-0.213
		Der & Deary 2006 – Sample 9	332	0.033
		Der & Deary 2006 – Sample 10	371	-0.257
		Der & Deary 2006 – Sample 11	313	-0.060
		Der & Deary 2006 – Sample 12	296	0.012
		Der & Deary 2006 – Sample 13	256	-0.090
		Der & Deary 2006 – Sample 14	235	0.009
		Der & Deary 2006 – Sample 15	219	0.063
		Der & Deary 2006 – Sample 16	237	-0.071
		Der & Deary 2006 – Sample 17	227	0.188
		Der & Deary 2006 – Sample 18	216	0.096
		Der & Deary 2006 – Sample 19	213	-0.177
		Der & Deary 2006 – Sample 20	180	0.182
		Der & Deary 2006 – Sample 21	229	-0.044
		Der & Deary 2006 – Sample 22	226	-0.415
		Der & Deary 2006 – Sample 23	209	-0.294
		Der & Deary 2006 – Sample 24	223	-0.348
		Der & Deary 2006 – Sample 25	145	-0.072
		Der & Deary 2006 – Sample 26	170	-0.098
		Der & Deary 2006 – Sample 27	139	-0.327
		Der & Deary 2006 – Sample 28	123	-0.392

Table 2 - List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Reaction Time	Choice	Der & Deary 2006 – Sample 29	136	-0.105
		Der & Deary 2006 – Sample 30	99	0.048
		Der & Deary 2006 – Sample 31	63	-0.365
		Der & Deary 2006 – Sample 32	59	-0.334
		Der & Deary 2006 – Sample 33	40	-0.277
		Der & Deary 2006 – Sample 34	19	-0.744
		Der & Deary 2006 – Sample 35	14	0.134
		Der & Deary 2006 – Sample 36	4	-0.099
		Der & Deary 2006 – Sample 37	4	-0.490
		King 1997	30	-0.319
		Kristjansson et al. 2008	12	-1.295
		Lorenz & Manzey 2001	243	-0.719
		Noble et al. 1964	600	-0.691
		Taimela & Kujala 1992	119	-0.423
	Psychomotor Vigilance Task	Beijamini et al. 2008	34	-0.898
		Kim et al. 2007 – Sample 1	81	-0.441
		Kim et al. 2007 – Sample 2	260	-0.467
		Kim et al. 2007 – Sample 3	204	-0.375
		Kim et al. 2007 – Sample 4	66	-0.227
		Kristjansson et al. 2008	20	-0.827
		Venker et al. 2007 – Sample 1	27	-0.444
		Venker et al. 2007 – Sample 2	20	-0.811
		Venker et al. 2007 – Sample 3	39	0.066
		Venker et al. 2007 – Sample 4	31	-0.186
		Venker et al. 2007 – Sample 5	30	0.386
		Venker et al. 2007 – Sample 6	15	0.060
	Target Detection Time	Johnson & Merullo 1996	24	-0.068
	Dynavision	Klavora & Esposito 2002	126	-1.321
	Target Shoot Time-to-Fire	Russell et al. 2005	620	-0.703
Motor Coordination	Marking	Bornstein 1985	365	0.009
		Bozikas 2010	62	-0.681
		Dodrill 1979	94	-0.070
		Fein et al. 2006	48	0.058
		Fisk et al. 1992	70	-0.105
		Gale et al. 2009	12,786	0.146
		Pluncevic-Gligoroska et al. 2010	89	-0.175
		King 1997	30	-0.526
		Peters & Servos 1989 – Sample 1 – Right-handers	57	0.179
		Peters & Servos 1989 – Sample 2 – Left-handers	53	0.422
		Peters & Servos 1989 – Sample 3 – Ambidextrous	65	0.287
		Reitan 1971	98	0.110
		Smith & Fein 2010	58	-0.106
		York & Biederman 1990 – Sample 1 – Age 26.45	21	-0.482
		York & Biederman 1990 – Sample 2 – Age 34.15	24	0.031

Table 2 - List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Motor Coordination	Marking	York & Biederman 1990 – Sample 3 – Age 44.95	14	0.258
		York & Biederman 1990 – Sample 4 – Age 54.6	22	0.538
		York & Biederman 1990 – Sample 5 – Age 64.55	26	0.254
		York & Biederman 1990 – Sample 6 – Age 74.2	26	-0.130
		York & Biederman 1990 – Sample 7 – Age 84	13	0.315
	GATB K	GATB database	40,481	0.484
		Droege 1967 - Sample 1	7,078	0.528
		Droege 1967 – Sample 2	6,839	0.600
		Droege 1967 – Sample 3	6,624	0.578
		Droege 1967 – Sample 4	6,167	0.577
	Gibson Spiral Maze	Harris et al. 1994	48	0.636
Finger Dexterity	GATB F	Bensel, Fink & Melian 1980	24	1.768
		GATB database	40,481	0.231
		Droege 1967 - Sample 1	7,078	0.440
		Droege 1967 – Sample 2	6,839	0.452
		Droege 1967 – Sample 3	6,624	0.437
		Droege 1967 – Sample 4	6,167	0.395
	Transfer	Briggs & Tellegen 1971 – Sample 1 – Age 4	20	0.605
		Briggs & Tellegen 1971 – Sample 2 – Age 5	20	0.457
		Briggs & Tellegen 1971 – Sample 3 – Age 6	20	0.044
		Briggs & Tellegen 1971 – Sample 4 – Age 7	20	0.293
		Briggs & Tellegen 1971 – Sample 5 – Age 8	20	0.485
		Briggs & Tellegen 1971 – Sample 6 – Age 9	20	-0.025
		Briggs & Tellegen 1971 – Sample 7 – Age 10	20	0.301
		Briggs & Tellegen 1971 – Sample 8 – Age 11	20	-0.232
		Briggs & Tellegen 1971 – Sample 9 – Age 12	20	0.549
		Briggs & Tellegen 1971 – Sample 10 – Age 13	20	-0.133
		Briggs & Tellegen 1971 – Sample 11 – Age 14	20	0.530
		Briggs & Tellegen 1971 – Sample 12 – Age 15	20	1.257
		Briggs & Tellegen 1971 – Sample 13 – Age 16	20	0.850
		Briggs & Tellegen 1971 – Sample 14 – Age 17	20	0.744
		Briggs & Tellegen 1971 – Sample 15 – Age 18	20	1.726
		Briggs & Tellegen 1971 – Sample 16 – Age 19-25	20	1.075
		Briggs & Tellegen 1971 – Sample 17 – Age 26-32	20	0.540
		Briggs & Tellegen 1971 – Sample 18 – Age 33-39	20	0.850
		Gale et al. 2009	12,770	0.100
	Assembled Parts	Brito & Santos-Morales 2002 – Sample 1 – Age 5.25	21	0.773
		Brito & Santos-Morales 2002 – Sample 2 – Age 5.75	19	0.204
		Brito & Santos-Morales 2002 – Sample 3 – Age 6.25	20	-0.074
		Brito & Santos-Morales 2002 – Sample 4 – Age 6.75	20	0.942
		Brito & Santos-Morales 2002 – Sample 5 – Age 7.25	18	0.811
		Brito & Santos-Morales 2002 – Sample 6 – Age 7.75	22	0.019
		Brito & Santos-Morales 2002 – Sample 7 – Age 8.25	20	1.135
		Brito & Santos-Morales 2002 – Sample 8 – Age 8.75	21	1.223

Table 2 - List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Finger Dexterity	Assembled Parts	Brito & Santos-Morales 2002 – Sample 9 – Age 9.25	20	0.459
		Brito & Santos-Morales 2002 – Sample 10 – Age 9.75	19	0.327
		Brito & Santos-Morales 2002 – Sample 11 – Age 10.25	20	0.017
		Brito & Santos-Morales 2002 – Sample 12 – Age 10.75	20	0.024
		Brito & Santos-Morales 2002 – Sample 13 – Age 11.25	20	0.624
		Brito & Santos-Morales 2002 – Sample 14 – Age 11.75	20	0.771
		Brito & Santos-Morales 2002 – Sample 15 – Age 12.5	21	0.668
		Brito & Santos-Morales 2002 – Sample 16 – Age 13.5	21	-0.049
		Brito & Santos-Morales 2002 – Sample 17 – Age 15	22	-0.697
		Gardner & Broman 1979 – Sample 1 – Age 5.25	60	0.201
		Gardner & Broman 1979 – Sample 2 – Age 5.75	60	-0.312
		Gardner & Broman 1979 – Sample 3 – Age 6.25	60	0.637
		Gardner & Broman 1979 – Sample 4 – Age 6.75	60	0.348
		Gardner & Broman 1979 – Sample 5 – Age 7.25	60	0.113
		Gardner & Broman 1979 – Sample 6 – Age 7.75	60	-0.045
		Gardner & Broman 1979 – Sample 7 – Age 8.25	60	-.309
		Gardner & Broman 1979 – Sample 8 – Age 8.75	60	0.005
		Gardner & Broman 1979 – Sample 9 – Age 9.25	60	0.072
		Gardner & Broman 1979 – Sample 10 – Age 9.75	60	0.315
		Gardner & Broman 1979 – Sample 11 – Age 10.25	60	0.267
		Gardner & Broman 1979 – Sample 12 – Age 10.75	60	0.610
		Gardner & Broman 1979 – Sample 13 – Age 11.25	60	0.546
		Gardner & Broman 1979 – Sample 14 – Age 11.75	60	0.335
		Gardner & Broman 1979 – Sample 15 – Age 12.25	60	0.618
		Gardner & Broman 1979 – Sample 16 – Age 12.75	60	0.660
		Gardner & Broman 1979 – Sample 17 – Age 13.25	60	0.210
		Gardner & Broman 1979 – Sample 18 – Age 13.75	62	0.498
		Gardner & Broman 1979 – Sample 19 – Age 14.25	60	0.364
		Gardner & Broman 1979 – Sample 20 – Age 14.75	60	0.398
		Gardner & Broman 1979 – Sample 21 – Age 15.25	58	0.661
		Gardner & Broman 1979 – Sample 22 – Age 15.75	54	0.569
		Krueger 1996	96	0.896
		Mathieowetz 1986 – Sample 1 – Age 14.5	54	-0.318
		Mathieowetz 1986 – Sample 2 – Age 15.5	65	0.141
		Mathieowetz 1986 – Sample 3 – Age 16.5	57	0.701
		Peters & Servos 1989 – Sample 1 – Right-handers	57	0.645
		Peters & Servos 1989 – Sample 2 – Left-handers	53	0.993
		Peters & Servos 1989 – Sample 3 – Ambidextrous	65	0.824
		Peters 1990 – Sample 1 - Left-handers	41	1.035
		Peters 1990 – Sample 2 - Right-handers	34	0.669
		Peters 1990 – Sample 3	53	0.891
		Schuneman 1985	118	0.160
		Tiffin 1948- Sample 1 – College students	873	0.279
		Tiffin 1948 – Sample 2 – Industrial Applicants	5003	0.541

Table 2 – List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Finger Dexterity	Assembled Parts	Treadwell 1997	24	-1.378
	Tweezers Peg Placement	Peters & Campagnaro 1996	104	0.000
	Beads	Schulman 1969	375	0.098
Manual Dexterity	Hand Tool Dexterity	Bensel, Fink & Melian 1980	24	-0.958
	Grooved Pegboard	Bornstein 1985	365	0.249
		Bryden & Roy 2005 – Sample 1	17	1.017
		Bryden & Roy 2005 – Sample 2	136	1.279
		Ruff & Parker 1993 – Sample 1	179	0.682
		Ruff & Parker 1993 – Sample 2	89	0.773
		Ruff & Parker 1993 – Sample 3	89	0.065
		Schmidt et al. 2000	102	0.550
		Van Wijk 2012 – Sample 1	170	0.356
		Van Wijk 2012 – Sample 2	1,056	0.479
	Large Peg Placement	Briggs & Tellegen 1971 – Sample 1 – Age 4	20	0.122
		Briggs & Tellegen 1971 – Sample 2 – Age 5	20	0.178
		Briggs & Tellegen 1971 – Sample 3 – Age 6	20	0.076
		Briggs & Tellegen 1971 – Sample 4 – Age 7	20	-0.261
		Briggs & Tellegen 1971 – Sample 5 – Age 8	20	-0.171
		Briggs & Tellegen 1971 – Sample 6 – Age 9	20	-0.024
		Briggs & Tellegen 1971 – Sample 7 – Age 10	20	0.330
		Briggs & Tellegen 1971 – Sample 8 – Age 11	20	1.352
		Briggs & Tellegen 1971 – Sample 9 – Age 12	20	0.165
		Briggs & Tellegen 1971 – Sample 10 – Age 13	20	-0.230
		Briggs & Tellegen 1971 – Sample 11 – Age 14	20	-0.122
		Briggs & Tellegen 1971 – Sample 12 – Age 15	20	0.758
		Briggs & Tellegen 1971 – Sample 13 – Age 16	20	-1.007
		Briggs & Tellegen 1971 – Sample 14 – Age 17	20	-0.181
		Briggs & Tellegen 1971 – Sample 15 – Age 18	20	-0.297
		Briggs & Tellegen 1971 – Sample 16 – Age 19-25	20	0.061
		Briggs & Tellegen 1971 – Sample 17 – Age 26-32	20	-0.982
		Briggs & Tellegen 1971 – Sample 18 – Age 33-39	20	0.692
	Purdue Pegboard	Brito & Santos-Morales 2002 – Sample 1 – Age 5.25	21	0.432
		Brito & Santos-Morales 2002 – Sample 2 – Age 5.75	19	1.080
		Brito & Santos-Morales 2002 – Sample 3 – Age 6.25	20	0.407
		Brito & Santos-Morales 2002 – Sample 4 – Age 6.75	20	0.000
		Brito & Santos-Morales 2002 – Sample 5 – Age 7.25	18	0.340
		Brito & Santos-Morales 2002 – Sample 6 – Age 7.75	22	-0.129
		Brito & Santos-Morales 2002 – Sample 7 – Age 8.25	20	0.958
		Brito & Santos-Morales 2002 – Sample 8 – Age 8.75	21	1.014
		Brito & Santos-Morales 2002 – Sample 9 – Age 9.25	20	0.610
		Brito & Santos-Morales 2002 – Sample 10 – Age 9.75	19	-0.294
		Brito & Santos-Morales 2002 – Sample 11 – Age 10.25	20	0.740
		Brito & Santos-Morales 2002 – Sample 12 – Age 10.75	20	0.318
		Brito & Santos-Morales 2002 – Sample 13 – Age 11.25	20	0.073

Table 2 – List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Manual Dexterity	Purdue Pegboard	Brito & Santos-Morales 2002 – Sample 14 – Age 11.75	20	0.443
		Brito & Santos-Morales 2002 – Sample 15 – Age 12.5	21	0.675
		Brito & Santos-Morales 2002 – Sample 16 – Age 13.5	21	0.000
		Brito & Santos-Morales 2002 – Sample 17 – Age 15	22	0.758
		Gardner & Broman 1979 – Sample 1 – Age 5.25	60	0.395
		Gardner & Broman 1979 – Sample 2 – Age 5.75	60	-0.383
		Gardner & Broman 1979 – Sample 3 – Age 6.25	60	1.126
		Gardner & Broman 1979 – Sample 4 – Age 6.75	60	0.189
		Gardner & Broman 1979 – Sample 5 – Age 7.25	60	0.214
		Gardner & Broman 1979 – Sample 6 – Age 7.75	60	0.225
		Gardner & Broman 1979 – Sample 7 – Age 8.25	60	0.216
		Gardner & Broman 1979 – Sample 8 – Age 8.75	60	-0.066
		Gardner & Broman 1979 – Sample 9 – Age 9.25	60	0.023
		Gardner & Broman 1979 – Sample 10 – Age 9.75	60	0.303
		Gardner & Broman 1979 – Sample 11 – Age 10.25	60	0.642
		Gardner & Broman 1979 – Sample 12 – Age 10.75	60	0.471
		Gardner & Broman 1979 – Sample 13 – Age 11.25	60	-0.016
		Gardner & Broman 1979 – Sample 14 – Age 11.75	60	0.498
		Gardner & Broman 1979 – Sample 15 – Age 12.25	60	0.426
		Gardner & Broman 1979 – Sample 16 – Age 12.75	60	0.012
		Gardner & Broman 1979 – Sample 17 – Age 13.25	60	0.219
		Gardner & Broman 1979 – Sample 18 – Age 13.75	62	0.305
		Gardner & Broman 1979 – Sample 19 – Age 14.25	60	0.406
		Gardner & Broman 1979 – Sample 20 – Age 14.75	60	0.802
		Gardner & Broman 1979 – Sample 21 – Age 15.25	58	0.710
		Gardner & Broman 1979 – Sample 22 – Age 15.75	54	0.769
		Kilshaw & Annett1983 – Sample 1 – Age 3.5	15	0.455
		Kilshaw & Annett1983 – Sample 2 – Age 4	27	0.263
		Kilshaw & Annett1983 – Sample 3 – Age 5	26	-0.579
		Kilshaw & Annett1983 – Sample 4 – Age 6.5	73	0.396
		Kilshaw & Annett1983 – Sample 5 – Age 8.5	62	0.247
		Kilshaw & Annett1983 – Sample 6 – Age 10.5	72	0.337
		Kilshaw & Annett1983 – Sample 7 - Age 12.5	37	0.103
		Kilshaw & Annett1983 – Sample 8 – Age 14.5	34	0.000
		Kilshaw & Annett1983 – Sample 9 – Age 12	165	-0.697
		Kilshaw & Annett1983 – Sample 10 – Age 18	511	-0.241
		Kilshaw & Annett1983 – Sample 11 – Age 25.5	184	-0.332
		Kilshaw & Annett1983 – Sample 12 – Age 34.5	321	-0.332
		Kilshaw & Annett1983 – Sample 13 – Age 40.5	197	-0.105
		Kilshaw & Annett1983 – Sample 14 – Age 56.5	67	0.000
		Krueger 1996	96	0.637
		Mathiowetz 1986 - Sample 1	54	0.467
		Mathiowetz 1986 – Sample 2	65	0.666
		Mathiowetz 1986 – Sample 3	57	0.933

Table 2 – List of Studies, Continued

General Measure	Specific Measure	Study and sample information	Sample Size	Mean sex difference
Manual Dexterity	Purdue Pegboard	Peters 1990 – Sample 1	34	0.697
		Peters 1990 – Sample 2	41	0.654
		Schuneman 1985	118	-0.038
		Tiffin 1948 – Sample 1	873	0.706
		Tiffin 1948 – Sample 2	5,003	0.975
	GATB M	GATB database	40,481	-0.016
		Droege 1967 - Sample 1	7,078	-0.059
		Droege 1967 – Sample 2	6,839	-0.033
		Droege 1967 – Sample 3	6,624	-0.040
		Droege 1967 – Sample 4	6,167	-0.019
	Tactual Performance (Time)	Dodrill 1979	94	0.081
	Kimura Task	Peters 1989 – Sample 1 – Right-handers	57	-1.192
		Peters 1989 – Sample 2 – Left-handers	53	-1.163
		Peters 1989 – Sample 3 – Ambidextrous	65	-0.848
	Kimura Task	Peters & Campagnaro 1996	104	-1.627
	Product Assembly	Schell & Grasha 2001	92	-0.059
	Cattell Pegboard	Schulman 1969	375	0.083

General Measure follows Fleishman et al.'s (1984) taxonomy, adding Motor Coordination and excluding Response Orientation. Specific Measure sometimes combines measures of a different name that matched the same description as a more broadly used measure. N = Sample Size; Mean Sex Difference = Hedges *g* (Random Effects Model)

Table 3 - Meta-analysis of General Measures

General Measure	N	K	k	Mean Sex Diff	SE	95% CI	I^2	T^2
Speed of Limb Movement	1,083	2	29	-.055	.105	-.260, .150	63.216	.186
Wrist Finger Speed	4,041	16	34	-.634	.070	-.772, -.496	75.40	.112
Control Precision	7,077	9	12	-.423	.180	-.776, -.069	93.249	.292
Aiming	648	2	2	-.737	.089	-.910, -.563	.000	.000
Steadiness	1,107	4	37	.502	.074	.357, .647	16.095	.029
Multi-limb Coordination	5,413	2	2	-1.223	.049	-2.182, -.264	92.553	.445
Reaction Time	15,402	27	86	-.303	.036	-.373, -.233	72.895	.063
Motor Coordination	81,362	16	26	.252	.054	.150, .360	94.855	.033
Finger Dexterity	89,093	16	80	.373	.034	.307, .440	83.229	.025
Manual Dexterity	80,426	22	102	.190	.040	.112, .268	91.489	.084

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model);
SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index;
T^2 = Tau (squared) index

Table 4 – Speed of Limb Movement

		Meta-analysis results								Publication bias results					
										Trim and Fill					
Gen Measure	**N**	**K**	**k**	**Mean Sex Diff**	**Mean Sex Diff (Fixed)**	**SE**	**95% CI**	**I^2**	**T^2**	***ik***	**t&f Mean Sex Diff**	**t&f 95% CI**	**Δ Mean Sex Diff**	**Egger P value**	**B&M P values**
Speed of Limb Movement	1,083	2	29	-.055	-.173	.105	-.260, .150	63.216	.186	8	-.306	-.528, -.084	.251	.000	.000
By specific measure															
Forearm Tapping	723	1	11	-.386	-.391	.099	-.581, -.191	43.002	.047	0	-.386	-.581, -.191	0	.218	.500
Two-Plate Tapping	360	1	18	.251	.246	.147	.-.036, .538	49.751	.192	2	.144	-.153, .441	.107	.153	.003
Age moderators															
Under 10	385	2	10	-.062	-.236	.180	-.414, .290	64.592	.196	3	-.322	-.695, .051	.260	.000	.000
10 - 17	618	2	15	.000	-.119	.141	-.275, .276	64.145	.177	5	-.266	-.561, .029	.266	.004	.004
18 +	80	1	4	-.300	-.285	.419	-1.12, .521	71.619	.502						
Age nested under specific measure															
Forearm Tapping Under 10	265	1	4	-.549	-.549	.124	-.792, -.305	0.0	0.0						
Forearm Tapping 10-17	458	1	7	-.295	-.300	.138	-.564, -.025	53.091	.070						
Two-Plate Tapping Under 10	120	1	6	.408	.408	.178	.059, .758	0.0	0.0						
Two-Plate Tapping 10-17	160	1	8	.394	.382	.206	-.009, .798	42.597	.144						
Two-Plate Tapping 18 +	80	1	4	-.300	-.285	.419	-1.120, .521	71.619	.502						

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model); Mean Sex Diff (Fixed) = Hedges g (Fixed Effects Model); SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index; T^2 = Tau (squared) index; *ik* = number of trim and fill imputed samples; t&f Mean Sex Diff = trim and fill adjusted Hedges g; t&f 95% CI = trim and fill adjusted 95% confidence interval; Δ Mean Sex Diff = difference between Mean Sex Diff and t&f Mean Sex Diff; Egger = one-tailed *p*-value of Egger's test; B&M = one-tailed *p*-value of Begg and Mazumdar (with continuity correction).

Table 5 - Wrist-Finger Speed

		Meta-analysis results								Publication bias results					
										Trim and Fill					
Gen Measure	**N**	**K**	**k**	**Mean Sex Diff**	**Mean Sex Diff (Fixed)**	**SE**	**95% CI**	**I^2**	**T^2**	***ik***	**t&f Mean Sex Diff**	**t&f 95% CI**	**Δ Mean Sex Diff**	**Egger P value**	**B&M P values**
Wrist Finger Speed	4,041	16	34	-.634	-.547	.070	-.772, -.496	75.40	.112	0	-.634	-.772, -.496	0	.018	.101
By specific measure															
Finger Tapping	3,116	14	22	-.742	-.575	.090	-.919, -.565	79.601	.123	0	-.742	-.919, -.565	0	.003	.079
Hand Tapping	925	2	12	-.436	-.452	.110	-.651, -.220	61.493	.087	0	-.436	-.651, -.220	0	.339	.225
By study subsets															
Without 3 outliers by magnitude															
Without samples over 300	2,312	12	30	-.667	-.651	.069	-.803, -.531	59.186	.080	0	-.667	-.803, -.531	0	.181	.120
With only samples over 300	1,729	4	4	-.448	-.411	.202	-.843, -.052	93.934	.153						
Age moderators															
Under 10	640	2	5	-.378	-.184	.184	-.740, -.017	74.558	.121						
10 - 17	692	3	7	-.418	-.434	.145	-.701, -.134	69.197	.125						
18 +	2,709	13	20	-.784	-.667	.079	-.939, -.629	68.414	.073	0	-.784	-.939, -.629	0	.005	.072
Age nested under specific measure															
Finger Tapping 0-9	375	1	1	.055	.055	.103	-.147, .257								
Finger Tapping 10-17	32	1	1	-.696	-.696	.356	-1.394, .002								
Finger Tapping 18 +	2,709	13	20	-.784	-.667	.079	-.939, -.629	68.414	.073	0	-.784	-.939, -.629	0	.005	.072
Hand Tapping 0-9	265	1	4	-.529	-.529	.124	-.772, -.286	.000	.000						
Hand Tapping 10-17	660	2	8	-.393	-.421	.156	-.698, -.088	72.442	.137						
Field of Research															
Military	96	1	1	-.731	-.731	.209	-1.141, -.320								
Medical	137	1	1	-.415	-.415	.172	-.752, -.078								
Everything else	3,808	14	32	-.640	-.547	.075	-.787, -.494	76.655	.121	0	-.640	-.787, -.494	0	.023	.118

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model); Mean Sex Diff (Fixed) = Hedges g (Fixed Effects Model); SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index; T^2 = Tau (squared) index; *ik* = number of trim and fill imputed samples; t&f Mean Sex Diff = trim and fill adjusted Hedges g; t&f 95% CI = trim and fill adjusted 95% confidence interval; Δ Mean Sex Diff = difference between Mean Sex Diff and t&f Mean Sex Diff; Egger = one-tailed *p*-value of Egger's test; B&M = one-tailed *p*-value of Begg and Mazumdar (with continuity correction).

Table 6 - Reaction Time

		Meta-analysis results								Publication bias results					
										Trim and Fill					
Gen Measure	**N**	**K**	**k**	**Mean Sex Diff**	**Mean Sex Diff (Fixed)**	**SE**	**95% CI**	**I^2**	**T^2**	***ik***	**t&f Mean Sex Diff**	**t&f 95% CI**	**Δ Mean Sex Diff**	**Egger P value**	**B&M P values**
Reaction Time	15,402	27	86	-.303	-.243	.036	-.37., -.233	72.895	.063	0	-.303	-.373, -.233	0.0	.001	.000
By specific measure															
Choice Reaction Time	10,385	9	46	-.169	-.161	.034	-.236, -.103	60.426	.028	0	-.169	-.236, -.103	0.0	.170	.032
Psychomotor Vigilance Test	827	4	12	-.367	-.377	.080	-.524, -.210	11.871	.009	0	-.367	-.524, -.210	0.0	.303	.419
Simple Reaction Time	3,420	12	25	-.597	-.364	.088	-.769, -.425	75.855	.108	0	-.597	-.769, -.425	0.0	.000	.000
Field of Research nested under Specific Measure															
Choice x Military	12	1	1	-1.295	-1.295	.595	-2.461, -.129								
Choice x Everything else	10,373	8	45	-.166	-.159	.034	-.232, -.100	60.026	.027	0	-.166	-.232, -.100	0.0	.266	.065
PVT x Military	20	1	1	-.827	-.827	.448	-1.705, .050								
PVT x Medical	807	3	11	-.353	-.366	.081	-.512, -.193	12.622	.009	1	-.384	-.571, .196	.031	.193	.267
Simple x Military	70	1	1	-.907	-.907	.261	-1.418, -.397								
Simple x Medical	198	2	7	-1.549	-1.076	.368	-2.269, -.828	77.259	.694						
Simple x Everything else	3,152	9	17	-.398	-.314	.075	-.545, -.251	64.685	.046	0	-.398	-.545, -.251	0.0	.054	.022
By study subsets															
Without 5 outliers by magnitude (4.1,4.2,4.3,4.4,4.5) *All from the same study	15,302	27	81	-.268	-.234	.033	-.333, -.203	69.125	.050	0	-.268	-.333, -.203	0.0	.029	.002
Field of Research															
Military	746	4	5	-.714	-.711	.099	-.908, -.519	6.200	.005						
Medical	1,005	5	18	-.652	-.491	.134	-.915, -.390	69.319	.186	0	-.652	-.915, -.390	0.0	.021	.005
Everything else	13,651	18	63	-.234	-.204	.034	-.301, -.167	69.173	.043	0	-.234	-.301, -.167	0.0	.038	.004

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model); Mean Sex Diff (Fixed) = Hedges g (Fixed Effects Model); SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index; T^2 = Tau (squared) index; *ik* = number of trim and fill imputed samples; t&f Mean Sex Diff = trim and fill adjusted Hedges g; t&f 95% CI = trim and fill adjusted 95% confidence interval; Δ Mean Sex Diff = difference between Mean Sex Diff and t&f Mean Sex Diff; Egger = one-tailed *p*-value of Egger's test; B&M = one-tailed *p*-value of Begg and Mazumdar (with continuity correction).

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Table 7 - Motor Coordination

		Meta-analysis results								Publication bias results					
										Trim and Fill					
Gen Measure	**N**	**K**	**k**	**Mean Sex Diff**	**Mean Sex Diff (Fixed)**	**SE**	**95% CI**	**I^2**	**T^2**	***ik***	**t&f Mean Sex Diff**	**t&f 95% CI**	**Δ Mean Sex Diff**	**Egger p value**	**B&M p values**
Motor Coordination	81,258	15	26	.252	.450	.054	.150, .360	94.855	.033	0	.252	.148, .357	.000	.092	.482
By specific measure															
GATB K	67,189	2	5	.551	.518	.313	.499, .603	87.854	.003						
Marking	14,021	12	20	.033	.132	.056	-.076, .142	24.665	.011	0	.033	-.076, .142	.000	.026	.191
Age Nested under Specific Measure															
GATB K 10-17	26,708	1	4	.570	.570	.016	.540, .601	35.671	.000						
GATB K 18+	40,481	1	1	.484	.484	.010	.465, .504								
Marking 10-17	12,884	2	2	.145	.145	.018	.111, .180	.000	.000						
Marking 18+	1,137	10	18	-.022	-.021	.064	-.147, .102	5.528	.004	1	-.036	-.164, .092	.014	.408	.248
By study subsets															
Without samples of 5000+	1,283	12	20	.013	.010	.065	-.115, .142	15.581	.013	2	-.026	-.163, .112	.039	.328	.228
With only samples of 5000+	79,975	3	6	.485	.457	.071	.346, .624	98.758	.172	2	.433	.316, .551	.052	.369	.226
Age moderators															
10 - 17	39,592	3	6	.447	.428	.097	.258, .636	98.719	.051						
18 +	41,666	12	20	.060	.470	.102	-.141, .260	78.519	.121	2	.010	-.192, .211	.050	.000	.037

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model); Mean Sex Diff (Fixed) = Hedges g (Fixed Effects Model); SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index; T^2 = Tau (squared) index; *ik* = number of trim and fill imputed samples; t&f Mean Sex Diff = trim and fill adjusted Hedges g; t&f 95% CI = trim and fill adjusted 95% confidence interval; Δ Mean Sex Diff = difference between Mean Sex Diff and t&f Mean Sex Diff; Egger = one-tailed *p*-value of Egger's test; B&M = one-tailed *p*-value of Begg and Mazumdar (with continuity correction).

Table 8 - Finger Dexterity

	Meta-analysis results									**Publication bias results**					
										Trim and Fill					
Gen Measure	**N**	**K**	**k**	**Mean Sex Diff**	**Mean Sex Diff (Fixed)**	**SE**	**95% CI**	**I^2**	**T^2**	***ik***	**t&f Mean Sex Diff**	**t&f 95% CI**	**Δ Mean Sex Diff**	**Egger P value**	**B&M P values**
Finger Dexterity	89,093	16	80	.373	.288	.034	.307, .440	83.229	.025	12	.309	.244, .375	.064	.026	.006
By study subsets															
Without 3 outliers by magnitude (72.1, 91.5, 5.1)	89,025	14	77	.370	.288	.033	.304, .435	47.017	.040	10	.320	.256, .384	.050	.029	.011
Without samples of 5000+	4,131	12	73	.392	.338	.050	.294, .489	48.531	.072	16	.254	.151, .357	.138	.014	.000
Samples of 5000+	84,962	4	7	.369	.285	.057	.257, .481	98.174	.022						
Age moderators															
Under 10	1,295	4	27	.222	.190	.067	.090, .354	19.445	.021	8	.091	-.060, .242	.131	.008	.000
10 - 17	40,365	6	34	.369	.324	.052	.268, .470	87.919	.030	2	.354	.253, .454	.015	.271	.476
18 +	47,163	10	19	.562	.258	.083	.399, .724	87.062	.060	5	.435	.281, .588	.127	.007	.221

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model); Mean Sex Diff (Fixed) = Hedges g (Fixed Effects Model); SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index; T^2 = Tau (squared) index; *ik* = number of trim and fill imputed samples; t&f Mean Sex Diff = trim and fill adjusted Hedges g; t&f 95% CI = trim and fill adjusted 95% confidence interval; Δ Mean Sex Diff = difference between Mean Sex Diff and t&f Mean Sex Diff; Egger = one-tailed *p*-value of Egger's test; B&M = one-tailed *p*-value of Begg and Mazumdar (with continuity correction).

Table 9 - Manual Dexterity

		Meta-analysis results								Publication bias results					
										Trim and Fill					
Gen Measure	**N**	**K**	**k**	**Mean Sex Diff**	**Mean Sex Diff (Fixed)**	**SE**	**95% CI**	**I^2**	**T^2**	***ik***	**t&f Mean Sex Diff**	**t&f 95% CI**	**Δ Mean Sex Diff**	**Egger P value**	**B&M P values**
Manual Dexterity	80,426	22	102	.190	.035	.040	.112, .268	91.489	.084	17	-.001	-.014, .013	.191	.012	.268
By specific measure															
GATB M	67,189	2	5	-.025	-.0250	.008	-.04, -.01	.000	.000						
Grooved Pegboard	2,203	5	9	.550	.484	.102	.351, .750	72.958	.059						
Large Peg	360	1	18	.022	.019	.131	-.235, .279	33.035	1.02	0	.021	-.225, .267	.001	.216	.470
Purdue Pegboard	9,810	8	62	.310	.508	.076	.162, .458	86.712	.262	19	.093	-.085, .272	.217	.000	.001
By study subsets															
Without 1 outlier by magnitude (56.1)	80,322	22	101	.209	.037	.039	.132, .285	91.168	.077	15	.098	.019, .178	.111	.006	.308
Without samples of 5000+	8,130	19	96	.197	.227	.055	.088, .305	79.368	.197	18	.049	-.065, .163	.148	.191	.208
With only samples of 5000+	72,192	3	6	.132	.014	.100	-.063, .327	99.227	.059						
Age moderators															
Under 10	1,498	5	32	.210	.189	.064	.085, .335	23.472	.165	0	.210	.085, .335	.000	.166	.062
10 - 17	28,173	6	37	.126	-.023	.041	.045, .207	67.208	.116	14	-.018	-.101, .066	.144	.000	.133
18 +	50,755	11	33	.100	.065	.102	-.101, .301	96.777	.534	1	.060	.044, .080	.04	.179	.143
Age nested under specific measure															
GATBM Age 10-17	26,708	1	4	-.038	-.038	.012	-.062, -.014	.000	.000						
GATBM Age 18 +	40,481	1	1	-.016	-.016	.010	-.035, .004								
Large Peg Age 0-9	120	1	6	-.013	-.013	.175	-.356, .330	.000	.000						
Large Peg Age 10-17	160	1	8	.124	.113	.239	-.345, .592	57.537	.263						
Large Peg Age 18 +	80	1	4	-.126	-.118	.343	-.797, .546	58.915	.276						
Purdue Pegboard 0-9	1,003	3	25	.265	.254	.080	.109, .421	33.756	.051	5	.138	-.040, .317	.127	.185	.026
Purdue Pegboard 10-17	1,305	4	25	.345	.274	.092	.165, .525	60.644	.120	5	.252	.085, .419	.093	.007	.092
Purdue Pegboard 18 +	7,502	6	12	.284	.621	.186	-.080, .648	96.475	.370	1	.219	-.233, .671	.065	.029	.225

N = Number of subjects; K = number of studies; *k* = number of samples (i.e., number of effect sizes); Mean Sex Diff = Hedges g (Random Effects Model); Mean Sex Diff (Fixed) = Hedges g (Fixed Effects Model); SE = Standard Error; 95% CI = 95% confidence interval; I^2 = I (squared) index; T^2 = Tau (squared) index; *ik* = number of trim and fill imputed samples; t&f Mean Sex Diff = trim and fill adjusted Hedges g; t&f 95% CI = trim and fill adjusted 95% confidence interval; Δ Mean Sex Diff = difference between Mean Sex Diff and t&f Mean Sex Diff; Egger = one-tailed *p*-value of Egger's test; B&M = one-tailed *p*-value of Begg and Mazumdar (with continuity correction).