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Comparing Self-Report and Mental Chronometry Measures of Motor Imagery Ability

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Abstract

The present study investigated the relationship between two of the most common measures of motor imagery ability; self-report ratings and chronometric assessment. This was done for three types of imagery modalities: external visual imagery, internal visual imagery, and kinesthetic imagery. Measures of imagery ability (i.e., self-report and mental chronometry) were also compared across skill levels. Participants (N = 198) completed the Movement Imagery Questionnaire-3 (MIQ-3) to generate self-report ratings. Chronometric assessment was obtained by recording the duration of each MIQ-3 movement imaged and physically performed and then calculating a discrepancy score. There were no significant correlations between self-report and mental chronometry for any of the three motor imagery types ($p > .05$). When assessing the different types of motor imagery ability using self-report ratings, elite athletes had significantly higher kinesthetic imagery than internal visual imagery which was in turn significantly higher than external visual imagery ($p < .05$). When assessing motor imagery ability using mental chronometry, there were no significant differences in imagery type ($p > .05$). Findings suggest both measures address different components of MI quality and should be used together to obtain a more comprehensive assessment of motor imagery ability.

Key words: ease of imaging, visual imagery, kinesthetic imagery, movement imagery, temporal equivalence, mental chronometry

Comparing Self-Report and Mental Chronometry as Measures of Motor Imagery Ability

Motor imagery is the mental representation or cognitive rehearsal of a motor act or movement in the absence of any overt motor output. It is a cognitive strategy that can facilitate learning and relearning, increase muscle strength and flexibility, improve performance, and also modify cognitions and regulate arousal and anxiety (e.g., Cumming & Williams, 2012; Cumming & Williams, 2013; Guillot, Tolleron, & Collet, 2010; Holmes, Cumming, & Edwards, 2010; Lebon, Collet, & Guillot, 2010). Consequently, it has received interest from researchers and applied practitioners in fields such as sport science, physiotherapy, psychology, and neuroscience.

Despite the impact that imagery can have on learning and performance, an individual's ability to create and control images can determine the effectiveness of its use (Martin, Moritz, & Hall, 1999). Individuals with higher levels of imagery ability experience greater benefits from imagery compared with their lower level counterparts (e.g., Robin et al., 2007; Williams, Cooley, & Cumming, 2013). However, there are a number of factors that can influence an individual's imagery ability such as skill level. For example, more elite athletes often display higher levels of imagery ability compared to less elite (e.g., Roberts, Callow, Hardy, Markland, & Bringer, 2008; Williams & Cumming, 2011). For this reason it is important to assess imagery ability at the start of an imagery intervention.

When assessing imagery ability it is important to consider its multidimensional nature comprised of different processes (Morris, 2010). Key dimensions thought to reflect how well an individual can image include vividness, controllability, accuracy, duration, and ease (Morris, Spittle, & Watt, 2005). Additionally, models and frameworks highlighting the imagery process and how imagery can serve different functions suggest that the ability to image can be influenced by various factors. Although specific to visual imagery, Kosslyn

(1994) proposed an image can be generated, inspected, transformed and maintained. Cumming, Williams, Cooley, and Weibull (2012) explained how these stages are likely to also apply to movement imagery and used this notion when developing a model to give an overview of the different phases and temporal sequence of movement imagery. They proposed that an individual's imagery ability is likely to reflect how well he/she can perform each phase of the movement imagery process (i.e., generation, inspection, transformation, and maintenance) and the proficiency in each phase is likely to vary (Cumming et al., 2012). Consequently, assessing imagery ability may not be as straight forward as anticipated.

There have been a large number of measures developed to assess imagery ability. These include psychometric questionnaires (e.g., Roberts et al., 2008; Williams, Cumming et al., 2013), qualitative interviews (MacIntyre & Moran, 2007), physiological techniques (Collet & Guillot, 2010), neuroimaging (Guillot et al., 2008), and mental chronometry (Decety & Jeannerod, 1995; Decety, Jeannerod, & Problanc, 1989; Guillot & Collet, 2005b; for review on the different processes see Collet et al., 2011). Two of the most cost effective, feasible, and thus commonly used measures are psychometric questionnaires and mental chronometry. Questionnaires typically assess ease or vividness of imaging visual and kinesthetic imagery. Mental chronometry compares the duration of the imaged to the duration of the executed movement with a smaller discrepancy between the times indicating a more accurate image (i.e., a greater imagery ability). Although there have been some positive correlations between subjective and objective measures of imagery ability (e.g., Cui, Jeter, Yang, Montague, & Eagleman, 2007), the majority of the literature demonstrates that questionnaire scores seem to be unrelated to objective measures of imagery ability in various populations (e.g., de Vries et al., 2013; Lequerica, Rapport, Axelrod, Telmet, & Whitman, 2002; McAvinue & Robertson, 2007; Saimpont, Malouin, Tousignant, & Jackson, 2015). It has been suggested that different measures tap different dimensions and/or different aspects of the imagery process (Cumming et al., 2012; Lequerica et al., 2002) and there is a call to include multiple measures of imagery ability to compile a more comprehensive assessment (Collet et al., 2011). For example, Guillot and colleagues have started using a combination of questionnaires, mental chronometry, and autonomic nervous responses to produce a Motor Imagery Index (MII). This is thought to be more representative of a person's capacity to create and control vivid movement imagery (Guillot et al., 2008; Guillot et al., 2009; Roure et al. 1999). Similarly, other researchers have assessed imagery ability of stroke patients using a combined approach of questionnaires and mental chronometry (Malouin, Richards, Durand, & Doyon, 2008).

Very little research has compared self-report questionnaires and mental chronometry as measures of imagery ability. Additionally, these studies have produced inconsistent findings to date. When McAvinue and Robertson, (2007) compared the measures they established a small correlation between mental chronometry and self-report kinesthetic imagery ability. However, more recently Saimpont et al. (2015) found no significant correlations between the measures. In both studies, the task being imaged for the mental chronometry task was different to the tasks used in the self-report imagery. Consequently, it is unknown whether a lack of association is due to different imagery content between the measures and that imaging the same tasks for each assessment method will elicit a stronger relationship between the two measures of imagery ability. It is important to examine whether an individual who demonstrates high imagery ability on a movement used by a self-report questionnaire also demonstrates high imagery ability on the same task measured using mental chronometry.

It is also unknown whether the relationship between the two is consistent for the different imagery modalities and visual perspectives often used by individuals (i.e., external visual imagery, internal visual imagery, and kinesthetic imagery). Establishing whether or not these relationships exist would determine whether using both self-report and mental chronometry is redundant or if each provides unique information when assessing imagery ability. As previous research has demonstrated that self-report measures of imagery ability seem on the whole to be unrelated to more objective measures (e.g., de Vries et al., 2013; Lequerica, Rapport, Axelrod, Telmet, & Whitman, 2002), it has been suggested that different measures are likely to tap different aspects of movement imagery. Based on the stages of the imagery process outlined by Cumming et al. (2012), they proposed that different measures are likely to reflect an individual's proficiency at performing certain stages. More specifically, they suggested that questionnaires such as the MIQ-3 could tap an individual's ability to generate images, whereas mental chronometry is likely to reflect how well and individual can maintain an image. To investigate whether or not these measures relate to each other, the two measures need to be compared.

The Movement Imagery Questionnaire-3 (MIQ-3; Williams, et al., 2012) is a measure to separately assess external visual imagery (EVI), internal visual imagery (IVI), and kinesthetic imagery (KI) abilities using the same four movements (knee lift, jump, arm movement, and waist bend). In a unique approach, participants first physically perform each movement before imaging it. Because execution and imagery of the movement are performed when completing this questionnaire it means that mental chronometry can easily be obtained while the questionnaire is completed. Consequently, it seems appropriate to compare self-report and mental chronometry of EVI, IVI, and KI using this questionnaire.

With that in mind, the aim of the present study was to compare self-report and mental chronometry as measures of imagery ability by investigating the correlation between the two. Specifically, this relationship was investigated for the three main types of movement imagery ability; EVI, IVI, and KI as well as a global score. The MIQ-3 was used to eliminate any confounding effects resulting from using different imagery content. Consequently, prior to comparing both measures, the study first established whether the MIQ-3 was a suitable measure of chronometric assessment by comparing the executed and imaged times for each movement to ensure they correlated with one another. Based on the fact that research has suggested that self-report measures do not correlate with objective measures (de Vries et al., 2013; Lequerica, Rapport, Axelrod, Telmet, & Whitman, 2002; McAvinue & Robertson, 2007; Saimpont et al., 2015), it was hypothesized that no relationship would be found between self-report ratings of imagery ability and mental chronometry due to each tapping different dimensions of imagery ability and different aspects of the imagery process (Cumming et al., 2012).

To investigate mental chronometry as a measure of imagery ability in more depth, a second aim was to compare EVI, IVI, and KI ability reflected in mental chronometry, and investigate whether any differences are similar to any differences in EVI, IVI, and KI ability reflected in self-report ratings. Finally, because the literature has detected imagery ability differences in self-report measures as a result of skill level, a third aim of the study was to investigate whether similar differences were detected when assessing imagery ability using mental chronometry and compare the findings to imagery ability measured via self-report MIQ-3 ratings. Previous research has identified skill level differences in self-report ratings of imagery ability (Williams & Cumming, 2011) and suggested that experts are more likely to achieve more accurate temporal congruence (Guillot et al., 2012). Consequently, it was hypothesized that elite athletes would have better imagery ability than lower level athletes in both self-reported and mental chronometry measures.

Method

Participants

One hundred and ninety-eight participants (114 female, 84 male) from 32 different team (*n* = 107) and individual (*n* = 91) sports participated in the study. Participants were an average of 19.71 years old (*SD* = 1.70) and had been involved in their chosen sport for between 1 and 17 years (*M* = 8.38; *SD* = 4.05). They represented a variety of competitive levels including recreational (*n* = 40), club (*n* = 112), county (*n* = 21), regional (*n* = 12), and elite (*n* = 13).

Measures

Demographic information. Participants were asked to provide information about their age, gender, sport type, sport played, competitive level, and years of playing experience.

Movement imagery ability. The Movement Imagery Questionnaire-3 (MIQ-3; Williams et al., 2012) is a 12-item questionnaire measuring individuals' ease of imaging four movements (knee lift, jump, arm movement, and waist bend) from an IVI perspective, an EVI perspective, and a kinesthetic imagery (KI) modality. For each item, participants read a description of the movement, physically perform the movement, and then image the movement from the perspective or modality described. Ease of imaging each item is rated on a 7-point Likert-type scale ranging from 1 *(very hard to see/feel)* to 7 *(very easy to see/feel)*. Consequently, a higher score represents a greater ease of imaging. In the present study an average score for each subscale and one for the entire questionnaire was calculated to generate self-report imagery ability scores for each subscale and global imagery ability respectively. The MIQ-3 has demonstrated good psychometric properties and validity (Williams et al., 2012). In the present study the MIQ-3 demonstrated adequate internal reliability with Cronbach alpha coefficients above.70 for EVI (α = .79), IVI (α = .76), and KI (α = .81). For the present study, global MIQ-3 scores were calculated by creating an average score from all 12-items.

Mental chronometry. The ability to accurately maintain an image was assessed by calculating the discrepancy between the duration of physically performing and imaging each MIQ-3 movement. Consequently, when participants were completing the MIQ-3 the physical performance of each item served as the movement execution portion of the chronometry task. Similarly, imaging each MIQ-3 item served as the imagery portion of the chronometry task. Consequently, chronometry measures reflected EVI, IVI, and KI. Physical performance of each movement was recorded by a researcher who started a stopwatch at the onset of the movement and stopped the stopwatch once the movement had finished. Participants recorded the duration of their imaged movements by starting and stopping the stopwatch for themselves. The stopwatch was handed back to the researcher who recorded the duration of the movement and reset the watch while the participant recorded their MIQ-3 rating for that particular movement image. Discrepancy scores for each imagery type (i.e., EVI, IVI, and KI) were obtained by calculating an average discrepancy score from the four movements reflecting that subscale. A global discrepancy score was calculated by averaging the discrepancy score of all 12 movements.

Procedures

Following ethical approval from the university where the lead author is based, participants were recruited from an undergraduate degree program and different sport clubs based at the university and tested individually by an investigator. Those interested in taking part were explained the nature of the study and provided with an information letter. Those agreeing to participate understood it was voluntary and provided written consent. Participants were then provided with White and Hardy’s (1998) definition of mental imagery, descriptions of visual and kinesthetic imagery, and informed about the different visual imagery perspectives. Next participants completed the MIQ-3 while movement execution and movement imagery durations were timed by the researcher and participant respectively. Once the MIQ-3 was completed, all materials were returned to the researcher, and participants were debriefed on the nature of the experiment and thanked for their participation.

Results

Movement Imagery Ability Descriptives

The mean global MIQ-3 score was 4.89 (*SD* = .87). Respective mean EVI, IVI, and KI scores were 5.00 (*SD* = .96), 4.80 (*SD* = 1.17), and 4.87 (*SD* = 1.13). Mean movement execution times ranged from 3.38s to 3.59s and mean movement imagery times ranged from 3.31 to 3.51. Movement execution and imagery times, and MIQ-3 scores for EVI, IVI, KI, and global imagery are reported in Table 1.

Imagery and Actual MIQ-3 Movement Times

Significant correlations were found between global movement imagery and execution MIQ-3 times. These are displayed in Figure 1. A similar pattern also emerged when considering mean timing scores for the 12 MIQ-3 items ($r(196)=.80$, $p<.001$), EVI scores ($r(196)=.76$, $p<.001$), IVI scores ($r(196)=.79$, $p<.001$), and KI scores ($r(196)=.72$, $p<.001$).

Due to the significant correlations between movement imagery and execution times, the difference between movement imagery and execution times (i.e. Δ [execution-imagery]) for EVI (Δ_{EVI}), IVI (Δ_{IVI}) and KI (Δ_{KI}) was obtained, as well as the difference between mean execution and imagery global times (Δ_{Global}). Independent analyses of Δ_{EVI}, Δ_{IVI} and Δ_{KI} indicated that participants tended to achieve slightly shorter movement imagery times than execution times in the EVI condition (i.e., Δ_{EVI} =.11s, $t(197)=1.9$, $p=.059$, $\mu=0$, Cohen's $d=.13$). Nonetheless, participants achieved temporal congruence between imagined and executed actions when global imagery and actual times were considered ($\Delta_{Global}=.09$s, $t(197)=1.62$, $p=.107$, Cohen's $d=.10$), as well as during IVI ($\Delta_{IVI}=.08$s, $t(197)=1.42$, $p=.157$, $\mu=0$, Cohen's $d=.08$) and KI ($\Delta_{KI}=.08$s; $t(197)=1.16$, $p=.248$, $\mu=0$, Cohen's $d=.07$) conditions.

Self-report and mental chronometry

Correlations were run to investigate the relationship between MIQ-3 scores and Δ [execution-imagery] times. There were no significant correlations when considering either mean global MIQ-3 scores (*r*(196)=.00, *p* = .970), EVI scores (*r*(196)=.01, *p* = .285), IVI scores (*r*(196)=.00, *p* = .462), or KI scores (*r*(196)=.00, *p* = 898). Additionally, a median split of the sample based on Δ [execution-imagery] absolute chronometric times was performed to investigate whether self-report imagery ability differed between the groups. Wilcoxon signed rank tests revealed no significant differences for general (Z = 4651.5, *p* = .909), internal visual (Z = 4273.5, *p* = .056), external visual (Z = 3628, *p* = .366) and kinesthetic scores (Z = 3367, *p* = .848).

Imagery Modality and Perspective

A repeated measure MANOVA between MIQ-3 self-report and time recordings (i.e., Δ [executed-imagery] times) was conducted. Measurements between the different types of imagery (i.e., IVI, EVI and KI) were considered. The MANOVA yielded a marginally significant interaction between the measures (MIQ-3 ratings vs. Δ [actual-imagery] times) and the IMAGERY TYPE (i.e. EVI, IVI and KI) factor, $F(2,180) = 2.0$, $p = .065$, $\eta^2 = .02$. Post-hoc tests using repeated measure ANOVAs (Bonferroni type one error rate settled at α =.025) revealed a significant effect of IMAGERY TYPE on MIQ-3 scores, $F(2,330) = 2.99$, $p = .02$, $\eta^2 = .02$, whereas the IMAGERY TYPE effect on Δ [executed-imagery] times was far from significance, $F(2,530) = .38$, $p = .342$, $\eta^2 = .002$. Additional post-hoc tests carried on MIQ3-scores using Welch two-samples paired t-tests (Bonferroni type one error rate α =.016) highlighted that MIQ-3 IVI scores were significantly lower than EVI scores (*t*(196)=2.82, *p*=.015, Cohen’s *d*=.18) but not from KI (*t*(196)=.67, *p*=.503, Cohen’s *d*=.05) scores. Also, there was a trend for EVI MIQ-3 scores to be significantly greater than KI scores but this was not significant (*t*(196)=1.67, *p*=.040, Cohen’s *d*=.12).

Skill Level

We carried out a repeated measure MANOVA between MIQ-3 self-ratings and time recordings (i.e. Δ [executed-imagery] times) with SKILL LEVEL (recreational, club, county, regional, and elite) as a between subject factor. Interestingly, a significant IMAGERY TYPE * TEST (i.e., self-report and time recordings) * SKILL LEVEL interaction, $F(4,8) = 2.5$, $p = .011$, $\eta^2 = .05$ was found. As shown in Figure 2, elite athletes achieved higher MIQ-3 scores during KI, along with superior IVI ratings as compared to EVI. An opposite pattern of MIQ-3 ratings was observed for the other skills levels but this was not significant (Figure 2A). There were no significant differences in imagery ability ratings due to skill level when considering Δ [executed-imagery] times (Figure 2B).

Discussion

The aim of the present study was to compare self-report ratings and chronometric assessments of imagery ability using the MIQ-3. By using the same four movements to measure both participants' subjective reports of imagery ability and the more objective temporal congruence between the movement imagery and execution durations, we were able to keep the content of what was being imaged the same across assessment methods. In contrast, past research comparing measures of imagery ability has confounded this issue by varying content across assessments. It was hypothesized that there would be no significant relationship between the measures due to each measure taping a different aspect of the imagery process (Cumming et al., 2012).

Results revealed that movement imagery and execution times were significantly and positively correlated. This indicated that individuals who took longer to physically perform the MIQ-3 movements also took longer to image the MIQ-3 movements. This was apparent for all three MIQ-3 subscales. Results also revealed no significant differences in MIQ-3 movement imagery and execution times. Overall these findings suggest that participants are able to correctly reproduce the actual timing of the movement within their imagery irrespective of whether this is done using EVI, IVI, or KI. Consequently, the movements used in the MIQ-3 appear to be good candidates for a mental chronometry evaluation, despite only lasting a few seconds in duration.

We sought to delineate whether the two measures (self-report ratings and mental chronometry) tap different properties of the movement imagery experience. In support of our hypothesis, results revealed no significant relationship between the two measures for EVI, IVI, and KI. The incredibly small/nonexistent amount of variance reflected this lack of a relationship. In accordance with our hypothesis, data support the notion that the two imagery measures evaluate different properties of the imagery process (e.g., ease of being able to see and feel movements for self-report ratings, and ability to elicit the temporal aspects of movements for the mental chronometry assessment). It can be suggested that these measures complement one another.

The second aim of the present study was to investigate scores of each measure (self-report and mental chronometry) across the different imagery modalities and perspectives. Findings revealed that only self-report scores varied between the different modalities and perspectives indicating that variations as a result of the modality and perspective only occur for self-report measures of imagery ability rather than temporal congruence. The similarity in mental chronometry results across the different MIQ-3 subscales suggests that for basic movements, this measure may not be sensitive enough to tap differences in EVI, IVI, and KI ability.

As imagery ability can vary as a result of skill level (Roberts et al., 2008; Williams & Cumming., 2011), the final aim of this study was to investigate whether differences in imagery ability emerge as a result of skill level and whether this is similar for both measures of imagery ability (self-report and mental chronometry). Our hypothesis was partially supported as findings demonstrated that imagery ability reflected through self-report ratings was able to detect higher levels of imagery ability in more elite athletes. By contrast, this effect was not observed when looking at the temporal features of imagery.

Previous research has suggested that experts are more likely to achieve accurate temporal congruence (Guillot & Collet, 2005b). Therefore, the lack of difference in the present study regarding chronometry differences might be due to the nature and duration of the content (i.e., movements) used and/or the dimensions of imagery ability assessed (e.g., ease of imaging). It would be interesting to investigate the effects of competitive level on mental chronometry of more complex task lasting for longer durations and compare this to other self-report dimensions of imagery ability which are known to differ as a result of competitive level such as vividness (Roberts et al., 2008).

The findings from the present study coincide with previous research. Although self-report and mental chronometry are thought to be explicit measures of imagery ability (McAvinue & Robertson, 2007), findings support the suggestion made by Cumming et al. (2012) that these measures of imagery ability likely tap different phases of the imagery processes. For example, subjective questionnaire scores such as the MIQ-3 may tap an individual’s ability to generate an image. Conversely, mental chronometry and more generally processing of time likely addresses the ability to predict the consequences of the movement during imagery. Chronometry scores may relate to an individual’s ability to maintain and control an image (Cumming et al., 2012). Therefore, one may find it very hard to generate seeing a knee lift (represented by a self-report score of 1 on the MIQ-3) but although this is very hard to do, once generated this might be sustained for an adequate duration of time (represented by a movement imagery time being very similar to the executed time and thus a very small discrepancy score). It has been suggested that the MIQ-3 (along with other self-report questionnaires) does not assess imagery maintenance ability and thus likely does not relate to tasks involving this aspect of the imagery process (Gabbard & Lee, 2014). This suggests that both explicit measures of imagery ability used in the present study are not redundant and to gain a more accurate representation of an individual's imagery ability should be used concurrently (Collet et al., 2011; Saimpont et al., 2015).

The present findings clearly demonstrate a correlation between the time taken to imagine the movement and the time needed to perform the same movement while completing the MIQ-3 items. As shown in the literature, such temporal congruence is a window into an individual's representation of the movement rhythm, and mental chronometry recordings may be thus be a relevant tool to assess whether participants correctly perform the MIQ-3 imagery tasks. Despite this, a limitation of the present study could be considered the type of movements imaged. Although they enabled a direct comparison of self-report and temporal congruence using the same content, such chronometric data cannot shed light on the ability of the participants to preserve the timing of the movement during imagery of sport-related actions. To do so, further chronometric recordings would be necessary during imagery.

It is important to assess imagery ability due to the impact this can have on an imagery intervention (e.g., Robin et al., 2007). If self-report and mental chronometry measures are not related and are in fact complimentary, future research should examine how these might predict the success of an imagery intervention. One measure might be a better predictor than another for different outcomes such as learning new skills, regulating arousal and anxiety, or enhancing confidence. Only once we know this can researchers determine which measure might be better/more important to utilize at the start of an intervention or whether a combined approach is best suited. Until research demonstrates which measure of imagery ability is better able to determine the effectiveness of an imagery intervention, results of the present study support the suggestion of previous research to utilize a combination of measures to determine an individual's imagery ability (Collet et al., 2011; Saimpont et al., 2015).

In conclusion, the present study compared self-report and mental chronometry as measures of EVI, IVI, and KI ability. This was done by investigating the relationship between the two imagery measures specifically for each MIQ-3 subscale (EVI, IVI, and KI) and globally (comparing overall scores). Scores for each measure were also compared across each imagery modality/perspective to examine whether any differences between subscales were similar for both measures and what impact skill level had on this. The MIQ-3 was used to assess both self-report and mental chronometry to prevent imagery content being a confounding variable. Findings revealed that although the MIQ-3 appeared to be a valid measure of chronometric assessment, there was no significant relationship between the measures for each subscale or global imagery ability. Any differences between the subscales depended on the measure used as differences emerged for self-reported imagery ability but not mental chronometry imagery ability. Results support the notion that both measures are complimentary of one another and when assessing movement imagery ability and that multiple measures should be administered to determine a more comprehensive assessment.

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Table 1. MIQ-3 ease of imaging, movement execution time, and movement imagery time means scores (SD).

	EVI	IVI	KI	Global imagery
Ease of imaging	5.00 (0.96)	4.80 (1.17)	4.87 (1.13)	4.89 (0.87)
Movement execution times (s)	3.45 (1.27)	3.59 (1.24)	3.38 (1.27)	3.48 (1.97)
Movement imagery times (s)	3.33 (1.23)	3.51 (1.24)	3.31 (1.23)	3.39 (1.17)

Figures:

Figure 1.A. Correlation between general actual and imagery times. 1.B. Correlation between actual and external visual imagery times. 1.C. Correlation between actual and internal visual imagery times. 1.D. Correlation between actual and kinesthetic imagery times.

Figure 2.A. Influence of SKILL LEVEL and IMAGERY TYPE on MIQ-3 scores. 2.B. Influence of SKILL LEVEL and IMAGERY TYPE on Δ [actual-imagery] times.