Title: The quiet eye supports error recovery in golfing

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TITLE: The Quiet Eye supports error recovery in golf putting

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Abstract

Objectives: The aim of this study was to further examine the relationship between the Quiet eye (QE, Vickers, 1996) and performance. We aimed to scrutinise the relationship between QE and shot outcome and replicate the robust relationship between QE and expertise. Based on recent findings (Cooke et al., 2015) showing that motor planning is dependent upon the outcome of a previous attempt, we wanted to examine the influence of prior performance on the functionality of the QE. Design: We performed a 2 (expertise) x 2 (outcome) mixed design study. Participants performed golf putts until they had achieved 5 successful (hits) and 5 unsuccessful (misses) attempts.

Methods: 18 experienced and 21 novice golfers participated in the study. Putts were taken from ten feet while wearing a mobile eye tracker.

Results: Experienced golfers had consistently longer QE durations than novices but there was no difference in QE between randomly chosen hits and misses. However, QE durations were significantly longer on hits directly following a miss, but significantly shorter on misses following a miss.

Conclusions: This is the first study to have examined QE duration as a consequence of prior performance. Our findings highlight the important role of QE in recovering from an error and improving performance. The findings add further support for the response programming function of the QE, as additional ‘programming’ was needed to recover from an error. Findings also highlight the potential for a link between QE and the allocation of attentional resources to the task (effort).

Keywords: Expertise, Gaze, Motivational intensity, Conflict monitoring, Error recovery

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Introduction

The quiet eye (QE) - the final fixation or tracking gaze on a specific location that has an onset prior to the start of a final, critical movement (Vickers, 2007) - has emerged as a key predictor of proficient performance in targeting and interceptive tasks over the last 20 years. Indeed, a recent meta-analysis (Lebeau et al., 2016) found a large inter-individual mean effect size ($\bar{d}$ = 1.04; between experts' and novices' QE durations), and a moderate intra-individual effect size ($\bar{d}$= .58; between QE durations on successful and unsuccessful performance attempts) across 27 studies with 38 effect sizes. We sought to further our understanding of why the intra-individual effects are weaker than the inter-individual ones by revisiting Vickers' (1992) seminal study in golf putting that started this field of enquiry. We suggest that it might be overly simplistic to consider the QE - performance relationship for a trial in isolation, without considering the potential effect of the preceding attempt.

Vickers' (1992) seminal study examined the gaze behaviour of five low handicap (LH: 0-8) and seven higher handicap (HH: 10-16) golfers as they putted from 3 m. Although not yet defined as the QE (see Vickers, 1996) she found that LH golfers fixated the ball for significantly longer than the HH group during all phases of the putt. Furthermore, fixations on the ball were longer when the golfers achieved hits compared to misses (since supported by Wilson & Pearcey, 2009). However, QE's relationship with performance is not always so clear-cut. For example, in the study by Mann, Coombes, Mousseau, and Janelle (2011) several subjects from both the low handicap and high handicap group did not display differences in QE between their hits and misses. Moreover, van Lier, Kamp, and Savelsbergh (2008) found that longer final fixations on the ball, during the preparation phase of the swing (before moving the putter), were not related to more accurate performance. Although it must be noted that for both of the above studies the correct definition of the QE was not adopted. Finally, while Moore, Vine, Cooke, Ring, and Wilson (2012) revealed longer QE durations and more accurate putting performance for a QE trained group, subsequent mediation analysis revealed that the QE duration did not mediate differences in performance between QE trained and control groups (see also Reinhoff, Baker, Fischer, Strauss, & Schorer, 2012 in a dart throwing task). As such, it is clear that future research is warranted to qualify the results with regards to hit vs miss comparisons in golf putting.

There also appears to be a lack of consensus in the literature with regards to the mechanisms that explain the performance enhancing effect of the QE. While several potential mechanisms have been proposed (see Gonzalez et al., 2015 for a review), the response programming argument is probably the most widely reported: QE provides a sufficient period for the effective parameterization of the subsequent movement (Williams, Singer, & Frehlich, 2002). It is during this period when sensory information is synthesized with the mechanisms necessary to both plan (pre-programme) and control (online) the appropriate motor response. For example, in golf putting, the golfer must be able to hold information about the desired line of the putt in working memory while fixating the ball, and call upon a suitable motor programme to hit the ball with the requisite force and direction to achieve the desired outcome (Mann et al., 2011).

Explicit support for the response programming explanation in golf putting came from Moore et al. (2012). These authors found that more accurate performance could be attributed not only to longer QE durations, but also greater cardiac deceleration. Cardiac deceleration has been associated with greater external information processing during the preparatory phase of motor skill performance (Neumann & Thomas, 2009). Cooke et al. (2014) adopting an electroencephalogram methodology found that reductions in high alpha power during the final seconds preceding performance predicted successful putts. Due to high-alpha power being inversely related to cortical activity in regions of motor planning (premotor and motor cortex; e.g., Pfurtscheller, 1992), such reductions are suggested to reflect an increase in resources applied to response programming (see also Babiloni et al., 2008). Taken together, the findings of Moore et al. and Cooke et al. suggest that increased response programming is related to successful performance.

However, of particular interest to the current study, a follow up re-analysis of Cooke et al.'s (2014) original data found that the degree of response programming was greater (reduced high alpha power) following a miss compared to a successful putt (Cooke et al., 2015). The authors proposed that additional resources are devoted to motor planning when there is a need to correct for previous errors, indicating that putts are influenced by prior performance. When considering the actual game of golf this process seems highly relevant. If golfers miss the birdie putt there is the opportunity to try and recover performance and maintain par. Furthermore, missing a makeable putt on one hole is likely to affect how the golfer approaches a putt with similar parameters later in the round. These conclusions are supported by previous research from Lam, Masters, and Maxwell (2010), who also found that golfers allocate more resources to response programming – as indexed by elongated probe reaction times during the putt - following a missed putt. Such attempts to recover performance have been proposed to occur through an evaluative control process of conflict or error monitoring, where conflicts in information processing (an error or miss) result in compensatory adjustments in processing (Botvinick, Braver, Barch, Carter, & Cohen, 2001).

While QE researchers frequently adopt block designs and take an average, or compare random hits to misses, performance over trials can exhibit dependence (see Iso-Ahola & Dotson, 2014, for a review). Furthermore, as we have described above, the relationship between QE and performance is not entirely clear form the existing literature. As such, we propose that 'performance dependence' could explain why QE effects are not always found.

More specifically, if the QE can be associated with Cooke et al.'s (2015) reduced alpha power measure (see Wilson et al., 2012 for a rationale) then we would expect the QE duration to be influenced by the outcome of the preceding trial as well as in turn influencing the outcome of the current trial. The aim of this experiment was therefore to use a re-examination of Vickers' original study as a launchpad to then examine a more nuanced exploration of the QE's relationship with performance and expertise.

In line with Vickers (1992) and much of the literature (Lebeau et al., 2016), we first hypothesised that experienced golfers will have a longer QE than their less expert counterparts. Second, based on our proposed compensatory error recovery function for QE, we hypothesised that any intra-individual effect for putt outcome will be greater when examining QE on a trial-to-trial basis (i.e. a miss-hit sequence) compared to randomly selected comparisons (averaged hits and misses; cf. Vickers, 1992). Third, we predicted that longer QEs should be found when golfers are successful in recovering from an error rather than unsuccessful: responding to a miss with a hit compared to another miss.

Methods

Participants

We recruited 18 experienced single figure handicap golfers' (Age: *M* = 28.4, *SD* 14.5) (Handicap: M = 5.7, SD = 3.9). We received 21 responses to take part from Novice golfers with zero years of experience (Age: *M* = 23.9, *SD* = 7.1). Power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that based on an effect size (η_p^2= .21) from gaze measures found by Lebeau et al. (2016), thirty-four participants were considered sufficient to achieve a power of 0.8 in a F test, given α = .05. We therefore elected to test all 21 novice volunteers as previous experience has revealed that gaze data can be lost from novice participants particularly. Participants volunteered to take part and all provided written informed consent. University ethical approval was obtained prior to recruitment.

Design

A two proficiency (experienced vs novice) x two performance outcome (miss vs. hit) design was adopted. Participants performed a golf putting task on a flat artificial green from ten foot to a standard size sunken hole. The task required participants to achieve five unsuccessful putts (misses) and five successful putts (hits); however, participants were unaware of this achievement criterion (Vickers, 1992).

Apparatus

Participants putted using a standard length 90 cm steel-shafted blade style putter and standard size (4.27 cm diameter) white golf balls. Gaze behaviour is captured using a lightweight Applied Science Laboratories (ASL; Bedford, MA) Mobile Eye Tracker. The eye-tracking system used pupil and corneal reflection to calculate and record the momentary point of gaze (at 30Hz). A circular cursor, showing location of gaze in a video image of the scene (spatial accuracy of ± 0.5° visual angle; 0.1° precision), could be viewed in real time on a laptop screen installed with Eyevision (ASL). QE duration was calculated offline using Quiet Eye Solutions (QES) Vision-in-Action software (Quiet Eye Solutions Inc., Calgary, CA). QES uses the putting movement (recorded by the mobile eye's scene camera) and point of gaze to calculate the QE duration. This software automatically determines the frame of video when a final fixation is observed on the ball, prior to the frame signalling the beginning of the backstroke. This is the QE onset. The QE offset then occurs when the fixation deviates off the ball by more than 1° for 100 ms. Thus, QE offset minus QE onset equals QE duration.

Measures

Quiet Eye duration. The QE was operationally defined for golf putting as the final fixation towards the ball (Vickers, 2007). The onset of the QE occurs prior to initiation of movement (backswing) and the offset occurs when gaze deviates from the ball by more than one 1° visual angle and for more than 100 ms (Vine, Lee, Walters-Symons, & Wilson, 2015). While other putting studies have used different operational definitions of the QE (e.g. Mann et al., 2011; van Lier et al., 2008), this is the standard definition that should be used for the term QE. A consistent definition enables clear comparison to be made between studies which aid understanding of QE effects and non-effects. In the case where participants demonstrated no QE fixation a zero value was entered for that trial (Williams et al., 2002)[1]. Inter-rater reliability was assessed using the interobserver agreement method (see Thomas & Nelson, 2001). A second analyst scored 10 % (39 trials) of QE duration data and revealed an adequate level of agreement at 82% (Moore et al., 2012).

Procedure

On attending the single testing session, participants read an information sheet and completed the demographics form containing questions regarding their name, age, gender and handicap (if applicable). The eye tracker was fitted and calibrated by asking participants to adopt their putting stance while being instructed to hold their gaze on the centre of each the five balls positioned at their feet in turn. Participants had five familiarisation putts from ten feet. On completion of the setup the task was explained. The experimenter emphasised that performance error was being measured and so unsuccessful putts should be left as close as possible to the hole. Participants were asked to continue putting until told to stop. Testing

[1] Out of the possible 390 trials (5hits and 5 misses) no fixations occurred for 10 trials all of which were novice participants (2.56%).

duration varied among participants depending on the number of shots it took to complete the attainment criteria. Following completion participants were thanked, debriefed and given the opportunity to discuss their performance with the experimenter.

Data Analysis

We first analysed the five successful and unsuccessful putts using a split-plot ANOVA with skill level (experienced vs. novice) as the between-subjects factor and performance outcome (hit vs. miss) as the within-subject factor, with the alpha level set to < .05. In order to test our hypotheses regarding error recovery, we also analysed the QE duration on occasions where two specific pairs of putts occurred: a missed putt followed by a successful putt (miss-hit), and two consecutive missed putts (miss-miss)[2]. While the occurrence of these pairs of trials varied between participants (See appendix), a minimum of one and a maximum of five pairs for each trial combination was used [3]. Outliers classified as values more than 3.3 standard deviation units from the grand mean (Tabachnick & Fidell, 1996) were Winsorized by changing the extreme raw score to a value 1% larger or smaller than the next most extreme score (as in Shimizu, Seery, Weisbuch, & Lupien, 2011) [4]. Effect sizes were calculated using partial eta squared (η_p^2) for omnibus comparisons. All data analyses were conducted using SPSS 20.0.

[2] The analysis of pairs of putts was run post – hoc after considering the functional relevance of trial to trial effects. Consequently, each participant didn't attain consistent numbers of pair sequences, accounting for the variation in the numbers of pair sequences selected.

[3] Four participants (one novice, three experienced) did not obtain two consecutive misses and were removed from analyses (see degrees of freedom).

[4] One experienced participant had 6 univariate outliers for their QE duration scores across the different analyses.

Results

Experienced golfers achieved the success criteria of five successful attempts in significantly fewer putts (*M* =13.72 putts, *SD* = 9.88) than their novice counterparts (*M* = 25.66 putts, *SD* = 10.33), $t(37) = -3.67$; $p = .001$, CI [-18.53, -5.36][5].

Averaged Random Miss v Hit

ANOVA revealed a significant main effect for skill level, [$F(1,37) = 13.51$, $p = .001$, $\eta_p^2 = .27$, 95% CI [305.1, 1055]]. Experienced golfers revealed significantly longer QE durations (*M* = 1920.63 ms, *SE* = 135.79) than novice golfers (*M* = 1240.58 ms, *SE* = 125.72). No significant main effect for performance outcome, [$F(1,37) = 1.05$, $p = .311$, $\eta_p^2 = .03$, 95% CI [-43.23, 132.01]]; and no significant interaction effect between skill level and performance outcome, [$F(1,37) = 0.70$, $p = .407$, $\eta_p^2 = .02$],were found (see figure 1).

Miss-Hit Pairs

ANOVA revealed a significant main effect for skill level, [$F(1,37) = 16.90$, $p = .001$, $\eta_p^2 = .31$, 95% CI [386.6, 1137.9]. Experienced golfers again revealed significantly longer QE durations (*M* = 1902.39 ms, *SE* = 136.05) than novice golfers (*M* = 1140.15 ms, *SE* = 125.46). However, ANOVA also revealed a significant main effect for performance outcome, [$F(1,37) = 16.99$, $p = .001$, $\eta_p^2 = .32$, 95% CI [133.6, 391.8]]. Successful putts following misses had significantly longer QE durations (*M* = 1652.60 ms, *SE* = 104.70) than the preceding unsuccessful putts (*M* = 1389.93 ms, *SE* = 90.86). No significant interaction

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[5] Experienced golfers (*M* = 18.66 cm, *SD* = 9.24) also had significantly lower mean radial error (cm) on their missed putts than their less expert counterpart (*M* = 42.68 cm, *SD* = 15.12) $t(37) = -5.86$; $p = .001$.

effect was found between skill level and performance outcome, [$F(1,37) = 0.01$, $p = .936$, $\eta_p^2 = .00$], (see figure 2).

Miss-Miss pairs

ANOVA revealed a significant main effect for skill level [$F(1,33) = 15.98$, $p = .001$, $\eta_p^2 = .33$, 95% CI [398.31, 1223.98]]. Experienced golfers revealed significantly longer QE durations (M = 1905.81 ms, SE = 153.39) than novice golfers (M = 1094.67 ms, SE = 132.84). However, ANOVA also revealed a significant main effect between the QE duration of two consecutive missed putts [$F(1,33) = 4.24$, $p = .047$, $\eta_p^2 = .11$, 95% CI [1.51, 243.78]]. Following the first missed putt the QE duration got significantly shorter on the following missed putt (Miss 1 M = 1561.56 ms, SE = 114.34; Miss 2 M = 1438.92 ms, SE = 96.36). No significant interaction effect was found between skill level and performance outcome [$F(1,33) = 0.13$, $p = .724$, $\eta_p^2 = .01$], (see figure 3).

Discussion

The broad aim of this experiment was to establish the basis of QE's relationship with performance and expertise, by examining the influence of previous putts on subsequent QE durations and outcome. This is the first study to have examined QE duration in relation to functionally relevant pairs of shots. Although much research has found support for the association between longer QE durations and better performance (Lebeau et al., 2016) this is not always the case (Moore et al., 2012; van Lier et al., 2008; Reinhoff et al., 2012). The reason for different findings may be because performance does not occur in a vacuum and that previous trials may influence subsequent response programming. The current investigation was particularly interested in the role of previous errors on subsequent motor planning and performance, given the fit to recent theoretical accounts (Botvinick et al., 2001; Eysenck & Wilson, 2016).

Reinvestigating Vickers' (1992)

In common with Vickers (1992) and much of the literature (Lebeau et al., 2016) the QE proved to reflect a characteristic of expertise; Experienced golfers had significantly longer QE durations than novice golfers ($\eta_p^2 = .27$), an effect that is in keeping with Lebeau et al. (d = 1.04, $\eta_p^2 = .21$) and required fewer putts to achieve the success criteria. It seems that with experience and through training, experts learn to strategically direct their gaze control system to maximise relevant information acquisition (via the QE) to support subsequent motor response planning (Wilson, Causer, & Vickers, 2015). The increased QE duration also indicates experienced golfers do not strive for efficient processing, but rather process what is needed to be accurate. Furthermore, results support the EEG findings of Cooke et al. (2014) and Bablioni et al. (2008) and suggest that expertise – at least in self-paced tasks - is not reflected in processing efficiency (also see Klostermann, Kredel, & Hossner, 2014).

However, contrary to Vickers (1992) outcome findings, QE durations did not significantly differ between the randomly selected five successful and unsuccessful putts. The recent meta-analysis by Lebeau et al. (2016) also found that inter-individual effects of QE duration were stronger than intra-individual effects. However, grouping trials by outcome may miss some functional variability in QE duration associated with the *pattern* of putting success. Previous research has revealed that blocked putting trials are not in fact independent of previous attempts and more processing occurs following a miss due to compensatory error recovery mechanisms (Cooke et al., 2015). We therefore sought to differentiate between QE durations of successful putts that occurred directly following a miss (miss-*hit*) as opposed to randomly occurring hits and misses.

Error recovery

When the trial sequence was considered, a functional benefit of having a longer QE was uncovered. First, contrary to the previous analysis (figure 1) hits that followed immediately after a miss did have longer QE durations (figure 2) with a larger intra-individual effect (η_p^2 = .31) compared to the intra-individual effect of randomly selected outcomes (η_p^2= .03). While this difference suggests a response programming increase in QE following an error, we found a more nuanced effect than uncovered by Cooke et al. (2015) by examining occasions when a miss was followed by another miss. In these cases, we found that QE durations actually dropped on the second attempt (figure 2). In essence the results provide additional support for a functional role of longer QE durations in supporting trial-to-trial putting performance, particularly when trying to recover from an unsuccessful attempt.

Furthermore, the inhibition hypothesis (Klostermann et al., 2014) offers a potential explanation for the increase in QE duration when recovering from an error. Following a miss one could speculate that inhibition demands would increase and consequently the QE duration increases to ensure optimal movement variants are parametrised and successful performance follows. However, the inhibition hypothesis holds little explanation power when considering the decrease in QE duration on consecutive misses.

As such the important question from both a practical and theoretical viewpoint is why did participants not always try to increase their QE durations following an error? Botvinick and colleague's conflict monitoring hypothesis (CMH; Botvinick et al., 2001), suggests that unmet demand (poor performance) results in the detection of conflict, which drives the engagement of compensatory adjustments in control. This theory would therefore support Cooke et al.'s (2015) findings, but it does not explain why on some occasions, performers decided to not apply compensatory control processes (i.e. lengthening their QE duration). To potentially explain these occasions we draw from a model recently proposed by Harris et al. (Harris, Vine, & Wilson, 2017) that pairs the CMH with Wright's (1996) motivational intensity theory (MIT). Based on the idea that humans will avoid wasting energy, MIT predicts that effort will be invested proportionally to task demands until chances of success become low, at which point resources will be withdrawn. As such, it is possible that the attenuated QE on the consecutive miss occurrences reflects participants' withdrawal of effort from immediate task goals. Interestingly, this effect was consistent across both experienced and novice golfers in the current study. However, future research could further probe the extent to which the application of effort differs between novice and experienced golfers, in relation to successful and unsuccessful putts.

A complementary, albeit relatively speculative, explanation for the reduction in QE following a miss comes from Eysenck and Wilson's (2016) updated version of attentional control theory (ACT; Eysenck et al., 2007); ACT: Sport. Eysenck and Wilson (2016) indicate that unsuccessful performance can increase pressure on subsequent performance attempts, potentially causing an increase in anxiety. The experience of anxiety is determined by whether or not a performer exhibits attentional and/or interpretational biases under competitive pressure. An increased attentional bias might cause a performer to pay more attention to threat cues (e.g., errors they have made) and an interpretive bias might cause a performer to interpret errors as having an impact on how they will perform subsequently. We describe this explanation as speculative simply because anxiety was not measured in the current study. However, it is likely that following missed putts, participants would have experienced an increase in pressure, and the anxiety that results from such pressure has been reliably shown to disrupt the allocation of attentional resource (e.g. the QE, Vine et al., 2013). As such, it is possible that fluctuations in momentary anxiety might explain the differences in how participants responded to errors, and future research should examine these contentions.

Finally, unlike Cooke et al. (2015) we did not find any interaction effects; skill level did not moderate the performance outcome differences in QE duration. Cooke et al. suggested that experts are more sensitive to errors than novices, because they have a greater bank of performance-relevant resources to allocate to the task. However, as we have suggested, other psychological factors (motivation, anxiety) might be more important in the interpretation of errors than simply the degree of declarative knowledge available. It is also possible that QE is not as sensitive a measure of response programming as alpha power, and indeed, it has been proposed that the QE serves additional functions that are relevant to performance, for example an external focus of attention (Gonzalez et al., 2015; Vine et al., 2014).

Clearly future research needs to explore the effect of errors on participants' momentary state anxiety and also on their motivational intensity and applied mental effort in subsequent attempts. The extent to which QE is a measure of effortful compensatory processes (e.g., Harris et al., 2017; Moran et al., 2016) also needs to be clarified. Moreover, the number of data points that could be used to compare trial-to-trial sequences varied for each participant and were limited in some cases. Consequently, future research may wish to set explicit targets for the number of these specific sequences of trials (e.g. miss-hit) that are achieved, rather than simple hit v miss success criteria. Furthermore, although the number of hit and miss trials in the present study is in keeping with similar research examining the QE in golf (Moore et al., 2012) the impact of varying trial numbers on the efficacy of the findings relating to QE and performance warrants further investigation.

Conclusions

This is the first study to have examined QE duration as a consequence of prior performance. While previous research has examined the QE in a sub section of shots (e.g. Vine, Lee, Moore, & Wilson, 2013), here we have specifically examined the influence of performance failure on subsequent performance. Our findings extend understanding of the QE by demonstrating that when the influence of previous trials is considered, the QE duration is able to differentiate performance outcomes. However, the fact that differences in the QE were found on the basis of a particular trial selection strategy highlights methodological and conceptual considerations for QE research, particularly regarding the false assumption of trial independence and a possible compensatory error recovery function for the QE. These findings also have applied implications, in particular for golfers. Golfers should increase their QE duration following a miss to ensure that they don't compound their error and miss again. In terms of skill level, experienced golfers tended to display longer QE durations, confirming that the QE is a characteristic of expertise (Wilson et al., 2015). The study provides a novel insight into the functional relationship between QE durations and golf putting performance and further supports the response programming function of the QE. However, additional research is needed to further our understanding of how the QE's relationship with performance recovery attempts is moderated by the performer's psychological state (e.g. anxiety, motivation).

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Figures captions

Figure 1. QE duration of experienced and novice golfers during randomly selected unsuccessful (miss) and successful (hit) putts.

Figure 2. QE duration of experienced and novice golfers during unsuccessful followed by successful putts (miss-hit).

Figure 3. QE duration of experienced and novice golfers during consecutive unsuccessful putts (miss-miss).

Appendix. Number of trials selected, Mean and Standard Deviation per participant.

	Miss - Hit					Miss - Miss				
		Miss		Hit			Miss 1		Miss 2	
Novice	No. pairs	*M*	*SD*	*M*	*SD*	No. pairs	*M*	*SD*	*M*	*SD*
	4	208.5	113.56	433.25	118.38	5	500.00	584.93	240.00	183.15
	3	1299.67	404.15	1622	216.71	3	978.00	637.86	1311.00	164.51
	3	789	252.51	811	725.92	4	816.50	334.01	700.00	427.78
	3	644.67	558.3	755.67	379.45	2	750.00	165.46	833.00	424.26
	2	516.5	164.76	933.5	47.38	0				
	5	1320	595.77	1486.8	216.86	5	1193.40	445.09	1140.00	464.64
	4	566.75	499.68	983.25	657.96	4	775.00	550.72	725.00	842.59
	4	358.25	236.3	1466.5	528.42	5	1753.20	753.99	680.20	462.41
	4	1916.75	1175.49	775	103.37	4	608.25	411.27	808.25	68.84
	4	316.75	238.16	683.25	463.8	4	200.00	400.00	350.00	487.09
	2	1600	895.2	1900	1414.21	5	1640.20	745.95	1540.00	476.64
	3	1277.67	533.85	1411	157.65	4	925.00	738.44	766.75	594.49
	3	1222.33	157.47	1988.67	214.23	5	1920.00	172.74	1400.00	611.31
	2	966.5	188.8	933.5	235.47	3	1111.00	38.11	811.00	342.29
	4	508.25	452.33	975.25	177.22	5	640.00	622.90	393.40	436.20
	4	1150	1059.3	1650	424.02	5	753.40	836.72	1060.20	939.81
	5	1380	361.79	1226.8	432.31	5	1973.20	875.52	1806.80	856.55
	5	1066.8	882.19	1986.6	581.54	5	1746.60	382.63	1720.00	1273.91
	3	1789	762.01	2200	523.92	3	2277.67	892.52	2233.33	949.49
	3	811	154.15	1200	176.32	5	1213.20	175.56	1093.20	341.88
	3	1422.33	138.51	1333.33	378.59	3	1133.33	317.84	1266.67	405.49
Experienced										
	4	1325.00	238.10	1466.75	227.63	0				
	3	1122.33	107.22	1689.00	356.32	3	1266.67	393.09	1289.00	365.60
	3	1400.33	251.66	1777.67	584.97	2	2050.00	1107.33	1417.00	353.55
	3	2544.33	473.27	2433.33	384.09	4	2191.50	516.61	2516.75	485.23
	4	1241.50	257.48	1333.50	282.53	4	1200.25	105.30	1250.00	359.79
	4	1741.75	213.46	2008.25	152.53	1	1900.00	0.00	1633.00	0.00
	4	2735.33	455.58	3694.83	1267.04	4	3518.34	594.91	2807.80	581.59
	5	1400.20	168.28	1613.40	357.90	5	1826.60	121.35	1700.00	198.59
	2	1183.50	164.76	1333.50	47.38	2	1250.00	212.13	1083.50	23.33
	1	2100.00	0.00	2433.00	0.00	3	2355.67	1402.10	2044.33	1529.54
	3	2622.00	560.06	3055.67	1389.14	5	2706.80	513.40	2780.00	575.84
	3	1811.00	183.47	2055.33	333.76	2	2150.00	117.38	1833.50	330.22
	4	2708.25	451.07	3658.25	1254.50	2	3483.50	589.02	2700.00	377.60
	4	2025.00	300.04	1991.75	548.51	2	1400.00	377.60	2067.00	565.69
	5	1340.00	429.29	1566.60	700.41	5	966.80	370.35	1206.40	344.44
	1	900.00	0.00	833.00	0.00	0				
	4	1092.00	95.74	1216.50	110.86	5	1399.80	131.19	1180.20	170.80
	1	2633.00	0.00	2400.00	0.00	0				