VLT Player Tracking System

Nova Scotia Gaming Corporation
Responsible Gaming Research Device Project

Assessment of the Behavioral Impact of Responsible Gaming Device (RGD) Features:
Analysis of Nova Scotia Player-card Data - WINDSOR TRIAL

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FINAL REPORT

Prepared by Focal Research Consultants

Principal Investigators: T. Schellinck
T. Schrans

Turning Information into Insight

Focal Research Consultants Ltd.
7071 Bayers Road, Suite 326 • Halifax, Nova Scotia • B3L 2C2
Phone 902.454.8856 • Fax 902.455.0109 • Email focal@focalresearch.com

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EXECUTIVE SUMMARY

The Nova Scotia Gaming Corporation (NSGC) engaged Focal Research to review and analyze the player tracking data derived from Stage III of the Responsible Gaming Device (RGD) Research Project. The primary purpose of the analysis was to provide NSGC with feedback regarding the behavioral impact of the responsible gaming features using VLT player-card data compiled over the course of a six-month field trial of the system in Windsor–Mount Uniacke area of Nova Scotia.

The analysis of '*real*' player data differs strongly from traditional approaches used with survey data. Focal Research has unique experience in evaluation of responsible gaming features, database analysis, and analysis of player tracking data (e.g. *player-card, loyalty data*). Based on this experience, the information objectives were set and addressed under two principal criteria:

1. **Is there value for the customer (VLT Players) in introducing this RG system?**
2. **Is the behavioral impact of the RG system consistent with NSGC's goal *'to assist players to make informed decisions that foster responsible gambling'?***

These criteria were used to guide the research and analysis process in order to:

- ***identify behavioral impacts associated with use of the RG features;***
- ***assess the potential value of the RG features for the user,***
- ***explore the potential impact of RG use based on player's risk for problem gambling; and,***
- ***provide conclusions and recommendations as input to next steps surrounding further program development and implementation.***

During the research process, Focal Research developed and defined guidelines for analyzing the player tracking data including the establishment of a common unit of measurement (e.g. *day-session of play*) and the need to accommodate the pre-programmed, random action of the game in influencing outcomes. In addition to frequency of play, length of play and expenditure, impact was assessed for other outcome measures that were consistent with the RG features being tested and the behavioral information available in the player-card database such as *cash-out* (absolute dollars taken out of the machine during play), *rate of cash-out* (cash-out as percent of cash-in), *wins versus losses* (absolute dollars and percentage), *percent of winning sessions*, (sessions ending in '*cash-up'*), *percent of losing sessions* (sessions ending in '*cash-down'*), *rate of play* (number of '*pulls/spins*' per hour).

RGD System Design

The Responsible Gaming Device (RGD) and RG Tracking System used during the field test were provided by Techlink Entertainment.[1] The system was compromised of a unit attached to each video lottery terminal. The unit included a confidential card enrolment process whereby a player inserted a card and was then prompted to select a unique Personal Identification Number

[1] Techlink Entertainment is a company engaged in the design and development of gaming products with special emphasis on card-based player management technologies.

(PIN). Once the system was activated, a player had to '*swipe*' their card and enter their PIN in order to initiate each session of play. The unit was linked to a centralized database that recorded specified play activity for each card session and monitored system functions.

In addition to tracking and storing play activity, the RG System allowed players access to five responsible gaming (RG) features:

- ***'Account Summary'***: tracked expenditure, amounts won/lost over time while playing the machines (e.g. day, week, month, year).
- ***'Live Action'***: tracked expenditure, amounts won/lost and any limits set for the current play session only.
- ***'Money Limits'***: allowed players to set specific spending limits (e.g. pre-set or self-selected values) for certain periods (e.g. until closing, day, week, month).
- ***'Play Limits'***: allowed players to exclude themselves from play for a given period (e.g. until close, day, month, year).
- '***48-Hour Stop'***: allowed players to enact, immediately, a two-day exclusion period (e.g. quickly exclude themselves for a 48-Hour '*cool-down*' period).

RGD Database

The RG System files consisted of a database of video lottery (VLT) play activity archived over the course of the six-month field trial conducted from October 5, 2005 - March 24, 2006 in the Windsor-Mount Uniacke area of Nova Scotia. During the trial period, the use of a player card was mandatory in order to play any VLTs located in the test area (9 sites; ≈51 terminals). Each time the card was inserted into a machine a set of information was generated for approximately 40 variables including: **system variables** (e.g. *account id, device id*), **session characteristics** (e.g. *date, time of day*); **behavioral variables** (e.g. *money put in, money cashed out*); **outcome variables** (e.g. *money won-lost, games won-lost*), and; **use of RG features** (e.g. *viewed account summary information for current session or over time (day, month, year), set a money limit for play, self-excluded for a set period*). The final database represented all play information tracked by the RG System during the six-month trial period.

Research Design and Methodology

The player-card database represents the most accurate source of VLT behavioral data available for analysis. As the first study in the world to collect VLT player-card data there is much to be learned from this rich, unique dataset. However, in the current study analysis was focused solely on using the database to isolate and identify relevant impacts of the RG features tested during the trial. The primary challenges in addressing these study objectives were the lack of a baseline measure of behavior established prior to activation of the System's RG features and lack of information regarding player risk for gambling problems (e.g. *CPGI score*) among those using the machines during the field trial.

To address these issues, the player-card data was used to create '*pre-RG use*' benchmarks (e.g. *baseline measures of play before use of any of the RG features*) for comparison to behaviours and game outcomes following adoption of the features. Adoption and impact analysis was conducted using experimental and control group design. Trend analysis was undertaken to

assess the use and impact of the system over time. In addition, exploratory analysis was performed to evaluate impact by risk for problem gambling. A predictive behaviourial model was developed and used to segment all players in the database (n≈1,824) based on risk for problem gambling (e.g. *lower versus higher-risk player groups*). Once players were assigned by risk, comparisons were then conducted within each risk group for those who adopted use of the RG features (Experimental Group) versus those who did not (Control Group).

Generating a Common Unit of Comparison

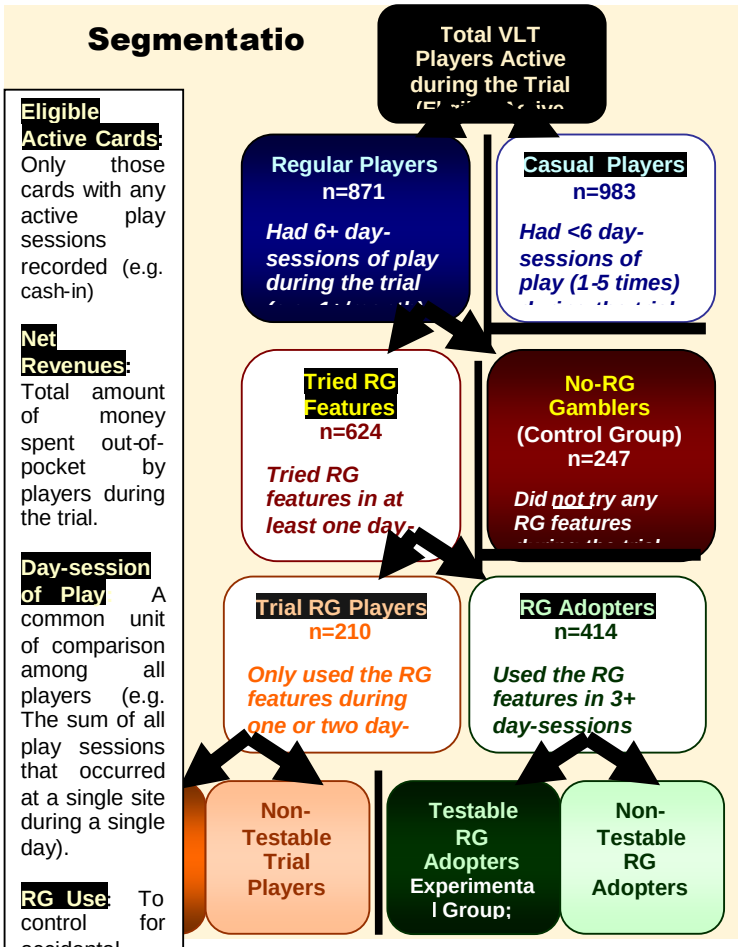
Player-card data (i.e. *player tracking data*) differs fundamentally from behavioral data obtained using traditional survey methods. The RG System recorded all play activity that occurred while using the player card and this play activity varied substantially among players. With self-reported survey data, everyone answers the same questions for the same period of time (e.g. *how much spent on the machines during the past month*). For those who only played once or twice this may be an easy number to remember but accuracy tends to decline as the frequency of play increases. The player tracking system eliminates this problem but because of differences in the level and degree of play among players, it was necessary to define a common base of measurement for comparing and profiling behavior and game outcomes.

For analysis purposes, a 'day-session' measurement base was created to profile session characteristics (e.g. *summation of all card sessions that occurred at a single site over a single day of play*). To ensure independence of events and session characteristics, outcomes for day-sessions were summed and averaged for each player before calculating and comparing group characteristics. This controlled for variations in frequency and timing of play among the various players active during the trial and created a common unit for comparison relevant for all players. It was also meaningful for assessing the RG features since the smallest period a feature could be activated was one day. Thus, while a card may be used more then once in a day it is not necessary to re-set any features.

Summary of Database Activity over the Trial

In total, 1,854 adults actively played any VLT in the Windsor Area during the field trial with almost 30,000 day-sessions of play recorded over the six-month period. Play activity was heavily skewed towards regular players, defined as those having played six or more times during the trial *(*e.g. *≈1+ times per month)*. These regular players (n=871) accounted for slightly under half (47%) of total VLT players in the test area, but contributed almost 93% of total day-sessions of play (n=28,007) and, correspondingly, 94% of total net revenues *(*e.g. *out-of-pocket money spent by players)*. The other half of the player base active during trial (53%) collectively contributed about 2,000 play sessions and about 6% of total net revenue. These players (n=983) were characterized as Casual Players *(*e.g. *<6 sessions of play during the trial)* and were excluded from much of the analysis as the inclusion of this large group of players distorted findings on a per player level and made little contribution to session profiles for impact testing. There was also insufficient data for these players to create reliable pre-post measures for analysis purposes.

The following figure illustrates the model used for analyzing the database and the various player segments created for analysis purposes.



Eligible Active Cards: Only those cards with any active play sessions recorded (e.g. cash-in)

Net Revenues: Total amount of money spent out-of-pocket by players during the trial.

Day-session of Play A common unit of comparison among all players (e.g. The sum of all play sessions that occurred at a single site during a single day).

RG Use: To control for accidental triggers, RG Use was defined as any day-session during which there was at least 3 RG screen activations (e.g. touch to call up feature, touch to trigger information, touch to close)

Testable: Able to create pre-measures (e.g. player did not use RG feature for at least 3 day-sessions before trying or adopting play)

Non-testable Unable to create pre-measures (e.g. fewer

Key Findings

- **Trial of the RG features was high.**

  Among Regular VLT Players (e.g. *those who played 6+ times during the field test*) trial of the RG features was high, with the vast majority (71%) having used an RG feature in at least one play session especially My Account (68% %) and Live Action (59%). Those Regular Players who tried any features on the system accounted for 78% of all play sessions and 78% of net revenue (e.g. *total player 'out-of-pocket' expenditure*) over the course of the trial, suggesting that experimentation of the RG system was highest among the most frequent VLT players.

- **Continued use (e.g. *adoption*) of the RG features was high especially among relevant target populations such as regular players.**

  Once a player had tried the RG features, almost two-thirds, (65%), continued to use them during additional play sessions. While curiosity may have lead players to try the features, it appeared that the majority received sufficient benefit to continue to activate the features. On-going use was particularly high among the more frequent players in the Windsor-Mount Uniacke area with almost half (48%) of those characterized as Regular VLT Players (i.e. *playing 1+ times/month*) taking up regular use of the features (e.g. *RG Adopters)*. Collectively, these RG Adopters were responsible for ≈ 61% of all VLT play sessions and ≈ 61% net revenues during the six-month trial period.

- **There were specific and consistent session characteristics associated with use or adoption of the RG features.**

  Comparative analysis consistently found that use of the RG system was associated with longer play sessions, increased wagering activity (e.g. *higher amounts of money put into the machines during play*), higher winnings (e.g. *higher amounts won during play*), and higher cash-outs (e.g. *higher amounts of money cashed out during the session*). At the same time there were no changes observed in player expenditure (e.g. *the amount of money spent out-of-pocket by the player*) nor was there any change observed in the frequency of play (e.g. *rate of play*). However, there were increases in the percent of sessions ending in a positive or '*win*' outcome (e.g. *percent winning sessions*) and in the percent of money that players cashed out as a percent of the amount they put into the machine (e.g. *cash-out*).

- **RG use and impact was stable and persisted over time with evidence of a decline in money spent emerging with extended use.**

  Although the field test was only six-months in length it was important to determine whether use of the features and the associated behavioral impact persisted over time, in particular as the novelty of the system declined. It was found that once players adopted use of the features, their usage pattern was consistent and stable up to 24 sessions following trial of the features, well beyond the period when most players could be

expected to be still learning the system. When specifically examined among those who played 18+ sessions during the test period, there was also preliminary evidence of a declining trend in amounts spent out-of-pocket for those sessions in which a RG feature was activated. This same trend was not observed for sessions when the player did not use the RG features. Although the trend detected for reduced expenditure was not significant during the current trial (e.g. *over six months*), the results were moving in the desired direction. Regardless, in the current study feature use and the impact of such use did not diminish over time or over repeated use.

- **There was a stronger effect for RG use observed in short sessions (<2 hours) when players typically were most likely to be in a loss situation (e.g. *minimizing money spent 'out-of-pocket' or cashing out wins*).**

  Longer play sessions tend to be associated more often with winning sessions, as the player is able to use winnings to extend their length of play. In contrast, shorter sessions usually occur because players run out of money sooner or reach their desired money limit. This means that shorter sessions are more often associated with losing sessions (e.g. *percent of sessions that end with the player having spent money; that is ending play with less money than they had started with*) and lower rates of cash-out (e.g. *the percent of cash the player takes out of the machine as a percent of the total amount of money they put in*). Due to this relationship, it was important to assess RG use relative to session length. As expected, cash-out rates (85%-88%) and percent winning sessions (30-32%) were higher during longer sessions of play (2+ hours), regardless of use of the RG features. Outcomes differed markedly for shorter sessions (<2 hours of play) with RG use, on average, associated with higher cash-out (≈77% versus ≈56%) and a higher rate of winning sessions (≈28% versus 20%). This same relationship was borne out when RG Adopters were compared to No-RG Players with the exception that after 30 minutes of play the cash-out rates for all RG Adopter sessions was consistently and significantly higher than rates for Non-Adopters (≈81% versus 69%, p<.001).

- **When other factors associated with expenditure were controlled for (e.g. *session length, pay-out rate and amount won per session),* the use of the RG features was found to be significantly associated with a decrease in money spent ('*out-of-pocket*') especially for use of 'Live Action' 'My Account Year' and 'Setting Limits'**

  No-RG Players (Control Group; n=247) and RG Adopters (Experimental Group; n=122) were used to test for differences in session characteristics before and after adoption of the features *(*e.g. *pre-post comparison).* A positive impact was found for use of informational RG features ('*Live Action*' and '*My Account'*) and the control RG features ('*My Money Limits*', '*My Play Limits'*, '*48-Hour Stop'*). There were no significant differences in pre-session profiles *(e.g. session characteristics prior to adoption*), with the exception that, on average, the RG Adopters played more often than the No-RG Players (about every 3.2 days versus every 9.2 days). However, during the post-trial sessions, the RG Adopters had longer play sessions, won more money, and had reduced expenditure compared to the No-RG Players. Using Repeated Measures ANOVA (GLM Analysis) with covariates to

control for the effects of session length, luck (e.g. *amount won per session*), and game design (e.g. *pay-out rates*), a significant effect was detected for use of most of the RG features; '*Live Action*'; '*My Account Year'* and '*My Play Limit'*. As hypothesized, those players who adopted use of the RG features reduced their expenditure as compared to the No-RG Players.

- **RG use differed by risk for gambling problems.**
  Although Problem Gamblers were just as likely to have adopted use of the '*Live Action'* feature as those players identified at lower levels of risk (≈48%), the Problem Gamblers tended to use it 3-4 times more often during play and referred to the other RG features less often in comparison to use by other players. '*Live Action*' is an RG feature that provides information on the current session of play only. Players in the other segments more often accessed the '*My Account*' feature that summarizes cumulative play outcomes over time.

- **Impact of RG use differed between lower-risk and higher-risk players, although there was no evidence of increased expenditure for either group.**
  On average, players who adopted use of the RG features significantly increased session length, reduced expenditures and had no change in their frequency of play. Lower-risk players who adopted RG use (i.e. *RG Adopters*) also exhibited higher wagering activity and longer play sessions but had no change in amount spent or frequency of play, although the lower-risk players who did not use the RG features (i.e. No-RG Players) ended up spending significantly more (p=.065). Higher-risk players who adopted RG use also had increased wagering activity, slightly longer play sessions, increased cash-out, higher winnings, and, on average, reduced expenditures. For the most part, due to small sample sizes for the higher-risk testable segment (n=49), these results were not significant at the 90%+ confidence level. However, per session expenditure was found to have declined among the high-risk players at the 83% confidence interval (p=.169) although there was also an increase in frequency of play that occurred at only the 67% level (p=.332). Therefore, the findings suggest that reductions in spend could potentially be offset by increased play producing no net change for higher-risk players.

Key Impact Measures	No-RG Players (Control Group) (n=247)	RG Adopters (Experimental Group) (n=122)
Average Play Length per Session (minutes)	**No Change** (**Pre:** 78 min. vs. **Post:** 77 min.)	✶✶✶**Change ↑** ***(95% CI, p<.05)*** (**Pre:** 82 min. vs. **Post:** 98 min.)
Average Spend per Session (*out-of-pocket)*	✶✶✶**Change ↑** *(95% CI, p<.05)* (**Pre:** $40.30 vs. **Post:** $52.69)	✶✶✶**Change ↓** ***(95% CI, p<.05)*** (**Pre:** $47.00 vs. **Post**: $39.82)
Frequency of Play per Month (times per month)	**No Change** (**Pre:** 3.2 times vs. **Post:** 3.1 times)	**No Change** (**Pre:** 9.3 times vs. **Post:** 9.3 times)

✶✶✶ ***probability < .05; 95% Confidence Interval***

Conclusions

1. **Players accepted the card based system for VLTs.**
2. **The RGD system provided on-going value to a significant proportion of regular players.**
3. **Use of the features was associated with increased play value (e.g. *longer play sessions, higher cash-outs, and more winning sessions*) and decreased amount spent.**
4. **There was a positive impact detected for players that was consistent with NSGC's objective *'to assist players to make more informed decisions about their gambling'*.**
5. **There were no significant negative RG impacts detected by risk for problem gambling, although Problem Gamblers appeared to respond to and to use the features differently and in some cases may use reductions in per session expenditures to play more often.**

Recommendations

Recommendation One

Introduce a player tracking system for the multi-channel video lottery program in Nova Scotia with mandatory registration, voluntary access to the various RG features and appropriate safeguards to monitor impact on a continuous basis.

Recommendation Two

Incorporate a program communication and stakeholder education strategy to promote and support use of the RG features as play management and information tools (e.g. *'informed choice', 'play limits', 'self-exclusion')*, especially among high-risk players.

Recommendation Three

In addition to the current, voluntary RG features, consider using player tracking system to implement the capacity for an involuntary 'safety-net' that will proactively alert players to risk factors or changes in risk associated with their play patterns.

Recommendation Four

After implementing the player tracking system, gather baseline information on player behaviors (e.g. *establish benchmarks*) before activating certain RG features such as 'Live Action', in order to confirm the impact of such feature use among the various player groups.

Recommendation Five

Continue to conduct additional research to explore player behaviour and response to the system in order to inform and support VLT program management and the process for province–wide implementation.

1.0 INTRODUCTION

The Nova Scotia Gaming Corporation (NSGC) engaged Focal Research to review and analyze the data system files derived from Stage III of the Responsible Gaming Device (RGD) Research Project. The primary purpose of the analysis was to provide NSGC with actionable feedback regarding the behavioral impact of Techlink Entertainment's Responsible Gaming (RG) System using the VLT player-card data compiled over the course of the six-month field trial of the system in Windsor–Mount Uniacke area of Nova Scotia.

The information gained from this analysis is intended to assist NSGC in the decision-making process with respect to the further development of a province wide, card-based system for video lottery in Nova Scotia. Therefore, a critical component in undertaking the analysis was to set criteria for assessing whether or not the results met the necessary conditions for moving forward: *Should NSGC proceed further in issuing a player registration and information system for VLTs? Do findings meet the criteria for proceeding to the next step?*

Analysis and application of player-card data is vastly different from approaches used with standard survey data. Consequently, behavioral measures and outcome targets that are set based on aggregate information, which is typically available from survey data, are not necessarily appropriate for assessing impact using actual play data, which must be complied first for individual players and then examined on an aggregate or segment level. Ideally, outcome targets should reflect theory about '*what*' play behaviors a particular feature is intended to influence and '*how*' such influence is manifested. For example, if an RG feature is intended to help players manage expenditure then it may not be appropriate to expect use of such a feature to produce any significant reductions in time spent playing. In some cases, setting a money budget using the RG features could lead to longer playing sessions due to the effect of random wins extending the amount of playing time available for the same amount of money.

Focal Research has unique experience in evaluation of responsible gaming features, database analysis, and analysis of player-card data (e.g. *'loyalty' data*). This expertise was used to set and address the information objectives under the following two principal criteria:

1. ***Is there value for the customer (VLT Players) in introducing this RG system?***
2. ***Is the behavioral impact of the RG system consistent with NSGC's goal to assist players to make informed decisions that foster responsible gaming?***

These criteria were used to guide the research and analysis process in order to:

- ***identify behavioral impacts associated with use of the RG features;***
- ***assess the potential value of the RG features for the user,***
- ***explore the potential impact of the RG features by risk for problem gambling; and,***
- ***provide conclusions and recommendations as input to next steps surrounding further program development and implementation.***

1.1 Project Background – Nova Scotia RGD Research Project

The NSGC Responsible Gaming Device (RGD) Research Project was a three stage, two-year research process to assess the impact and performance of a new card-based responsible gaming system designed by Techlink Entertainment specifically for use with video lottery terminals (e.g. *wide-area network, electronic gambling machines*)[2].

System functionality and player acceptance were evaluated in earlier stages of the research project consisting of the following:

- Usability Testing (November 2004 – January 2005);

[2] Two independent marketing research and communication firms were retained by NSGC to design and execute the RGD Research Project. Nucleus Consulting was responsible for methodology and product development testing whereas Omnifacts Bristol was responsible for designing and executing the player evaluation and RGD impact assessment in Stages I and Stages III. Readers are referred to NSGC for further information regarding these phases of the research. Techlink Entertainment is a company engaged in the design and development of gaming products with special emphasis on card-based player management technologies.

- A pilot study with a pre-screened sample of 120 players voluntary using the card and RGD technology installed on all VLTs in the designated test area of Windsor-Mount Uniacke (Stage I: March 2005-July 2005) ; and,
- Incorporation and re-testing of system modifications and/or improvements identified in the research (Stage II: July 2005 – October 2005).

Stage III, a live market trial of the RG System, was initiated September 2005.

1.1.1 RGD System Design Tested

The RG system consisted of a separate unit (e.g. *console*) that was attached to each designated video lottery terminal. The unit included a card enrolment system whereby a card was inserted into the unit and a player was then prompted to select a unique Personal Identification Number (PIN). When activated the unit required a card swipe and use of the PIN to initiate each play session. The unit was linked to a centralized database that recorded specified play activity for each card and monitored system functions.

In addition to tracking and storing play activity, the RG System allowed players access to five responsible gaming features:

- ***'Account Summary'***: tracked expenditure, amounts won/lost over time (e.g. *week, month, year*),
- ***'Live Action'***: tracked expenditure, amounts won/lost and any limits set for the current play session only,
- ***'Money Limits'***: allowed players to set specific spending limits (e.g. *pre-set or self-selected values*) for certain time periods (e.g. *until closing, day, week, month*),
- ***'Play Limits'***: allowed players to exclude themselves from play for a given period (e.g. *until close, day, month, year*),
- '***48-Hour Stop'***: allowed players to enact, immediately, a two-day exclusion period (e.g. *quickly exclude themselves for a 48-Hour 'cool-down' period*).

Refer to Section 1.3 RG Features Design and Functionality for detailed information about how the features operated.

1.1.2 Stage III Responsible Gaming Device Research – The Windsor Trial

RGD SYSTEM - TEST AREA

Stage III of the study consisted of a live field trial of the RG System conducted in cooperation with Techlink Entertainment and the Atlantic Lottery Corporation (ALC) in the Windsor-Mount Uniacke area of Nova Scotia. During this phase, use of a player card was mandatory. The trial commenced October 3, 2006, at which time Techlink Entertainment's Responsible Gaming (RG) System was fully implemented on 70 VLTs at 10 sites in Windsor (8) and the Mount Uniacke (2) area. Consistent with the new Provincial Gaming Strategy (April 2005), which called for a proportional reduction of 800 VLTs across the province, 17 machines were collectively removed from the test sites approximately one month after the trial started (November 1, 2006). On December 15, 2005, one of the retail test sites withdrew from the VLT program and both terminals were removed, further reducing the total number of active terminals (n=51) and participating sites (n=9) for the balance of the trial period. The trial occurred over a continuous six month, 22 week period and concluded March 25, 2006.

PLAYER-CARD DATABASE

The RG system files consisted of the database of video lottery (VLT) play activity archived over the course of the six-month field trial. During the trial period, the use of a player card was mandatory in order to play any VLTs located in the test area. Each time the card was inserted into a machine a set of information was generated for approximately 40 variables including: **system variables** (e.g. *account id, device id*), **session characteristics** (e.g. *date, time of day*); **behavioral variables** (e.g. *money put in, money cashed out*); **outcome variables** (e.g. *money won-lost, games won-lost*), and; **use of RG features** (e.g. *viewed account summary, set a limit for play*). Activity that occurred between the time a card was inserted and then removed from the machine was summarized, recorded under each variable, and then stored in the central database. Each entry was represented as a '*card-session*' of play. The final database

represented the information tracked by the RG System for almost all card sessions (≈99%) that occurred in the test area during the six-month trial period.[3]

STAGE III RESEARCH DESIGN

Omnifacts Bristol's research design for the study was primarily based on the establishment of a player test-panel (n≈137-158) for which three data sources were to be used to assess player awareness, attitudes and behavior: panel surveys conducted at ≈ two-month intervals during the trial (3); focus group discussions (3), and the actual player-card data for each panel member from the card system.

One of the primary objectives of the Stage III research was to assess the differential up-take and impact of RGD use by risk for problem gambling as measured by the Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (*Non-Problem: CPGI Score=0, Low Risk: CPGI Score=1-2, Moderate Risk: CPGI Score=3-7, Problem: CPGI Score=8+*).[4] During the course of the project certain methodological issues emerged that had implications for reducing the sample size of the test-panel (n≈88) and limited the ability of the panel research to address the behavioral objectives of the study in any conclusive manner. Moreover, concerns surrounding '*card-sharing*' observed among panel members called into question the integrity and suitability of the player-card data in conducting further analysis using this important data source. (See Omnifacts Bristol Report prepared for NSGC.)

Therefore, NSGC commissioned the principals at Focal Research to conduct an independent review of the data files for the project.

[3] Throughout Stage III the performance of the RG system was monitored by Techlink Entertainment and ALC to identify and correct any system malfunctions or service disruptions. The RG network was linked to ALC's central server in Moncton NB, where machine data was continuously stored and evaluated. With the exception of two incidents, which minimally interfered with card tracking over the trial, system availability (and, thus, player tracking data) was reported to approach 99%.

[4] The Problem Gambling Severity Index (PGSI) is a subscale consisting of nine scored items included in the CPGI developed by Harold Wynne, Jackie Ferris, and Eric Single for the Inter-provincial Task Force on Gambling in 2001. Responses to the nine statements are scored and summed in order to classify gamblers into one of four categories (Non-Problem: CPGI=0, Low Risk: CPGI=1-2, Moderate Risk: CPGI=3-7, Problem: CPGI=8+).

1. 2 Preliminary Analysis and Review of Stage III Player-Card Data

Focal Research was retained to lead the review and provide conclusions and recommendations regarding analysis of the player-card database. Specifically, the purpose of the initial review was threefold:

1. ***Assess the potential implications of card-sharing behavior for further analysis of the player-card data;***
2. ***Determine if the data sources generated during Stage III of the RGD research could be used to conclude with any certainty whether pre-set behavioral targets for the RG features had been met or not;***
3. ***Examine the database to determine if it is possible to use the player-card data to isolate and assess the behavioral impact of the RG features and to identify other potential options for using this data to assess the behavioral impact of the RG features by risk for gambling problems.***

1.2.1 Card Sharing by Test-Panel Members

Based on the card-sharing information available from the survey data it was found that only a minority (≈2%; n=3) of panel members, primarily those identified as bar staff (n=2), was involved in '*regular*' card-sharing activity over the course of the study. Although 36% of panel members reported ever lending or borrowing a player card, the majority of these individuals (≈94%) only did so '*rarely*' or *'ocassionally'*, representing a minority of their play sessions. Those panel members who reported regular card-sharing during the field trial accounted for about 1.7% of the total play sessions by all panel members combined. Even when every session for which any card-sharing was reported was included, this represented about 5%-6% of total sessions for participating panel members, which is considered an acceptable level of error in so far as ≈95% of play sessions would have have occurred under the correct card number. For analysis at an aggregate level (e.g. *total players, total sessions*) error for per session data is non-

existent; all play sessions over the course of the study are represented in the database regardless of which card was used to record the activity.[5]

1.2.2 Data suitability in Addressing Pre-set Behavioral Outcomes

CPGI Category	Outcome Measure	Target
1. No-Risk/Low Risk	Reduce Average monthly spend	15% or less
2. No-Risk/Low Risk	Migration to other sites	5% or less
3. Moderate Risk	Reduce Average Monthly spend	20%
4. Moderate Risk	Reduce Session length 10%	20%
5. Moderate Risk	Reduce Frequency	20%
6. Problem Gamblers	Seek treatment help	10%
7. All Players	Use pre-set limit each play	10%

A set of seven behavioral outcome measures were originally defined prior to going to field with Stage III of the study. The outcomes were set by Omnifacts Bristol, in consultation with responsible gaming experts, as to what behaviors were being targeted by the various features of the current RGD System. After thorough review, the Principals at Focal concluded that it was likely not possible to use any of the current data sources available from the research to address the behavioral outcomes pre-set for the study; that is to determine whether or not RG use in the current study produced effects that met the targets set for players in each of the CPGI categories. However, the database had archived actual player data for almost all play sessions that occurred over the course of the six-month trial. Focal proposed setting new criteria for testing the impact of RG use that was consistent with analysis of the available player-card data. It was recognized that in order to be of assistance to NSGC in the decision-making process,

[5] A summary report of the card-sharing analysis and evaluation of the integrity of player-card data was provided to NSGC and subject to independent peer review prior to commencing with the current project.

information was required examining RG impacts and changes in *average spend* (Outcomes 1 & 3), *session length* (Outcome 4) and *frequency of play* (Outcome 5) as well as *on-going use* of the features (Outcome 7: *persistence of use*).

Assessment of *migration behavior* set under Outcome 2 was beyond the scope of the database analysis as play data was only collected for those sessions that took place in the test area during the trial period. Addressing *help-seeking behavior by Problem Gamblers* (Outcome 6) also was not possible through analysis of the RG System database.

1.2.3 Options for Assessing the Behavioural Impacts of the RG System

Preliminary review and analysis of the system data files indicated that the player database generated during Stage III was suitable for on-going analysis and represented a unique, rich and reliable source of play behaviour information. In terms of assessing the behavioural impact of RG use, there was some uncertainty as to whether or not it would be possible to isolate the effects of the RG features primarily due to the lack of a pre-exposure benchmark for comparison purposes. A research plan was designed to address the various data issues identified and was then submitted for review and approval by NSGC and the project stakeholders. The plan was based on the use of the player-card data to create '*pre-RG use*' benchmarks (e.g. *baseline measures of play before use of any of the RG features*) for comparison to behaviours and game outcomes following adoption of the features. In addition, exploratory analysis for measuring impact by risk for problem gambling was evaluated. It was proposed that by using the scored test-panel members (n≈140) originally screened by Omnifacts Bristol in the Stage III research it may be possible to develop a predictive behaviourial model that could be used to segment the eligible players in the database (n≈1,824) into groups based on risk for problem gambling (e.g. *lower versus higher-risk player groups*). Once players were assigned by risk then pre-post comparisons could be conducted for those at higher or lower-risk who either adopted or did not use the RG features during the trial.

1.3 RG Features Design and Functionality

In order to link use of the RG features to appropriate behaviors and outcomes measures it was necessary to have a firm understanding of the theory underlying '*how*' the features work, '*what*' outcomes the features were intended to influence, or were most likely to influence, and '*when*' such features were likely to be invoked (e.g. *conditions of use*).

The card-based system and features comprising the VLT responsible gaming device (RG features) were developed and provided for testing by Techlink Entertainment. The system consisted of a secure and confidential enrolment process to obtain a player card and a self-designated personal identification code (PIN) in order to activate the terminal, and to track and report on a per account (e.g. *per player card*) basis. In addition, the player card allowed users access to five optional, responsible gaming (RG) features over the course of the trial.

1.3.1 My Account Monitoring (Information Feature)

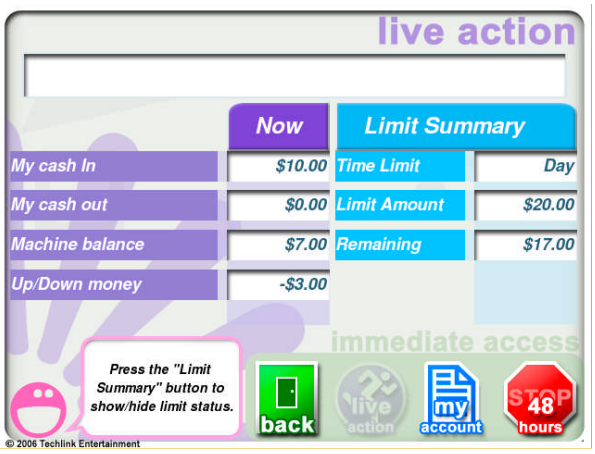
The '***My Account'*** feature tracked overall game outcomes for three key pieces of information:

1) The total amount of money put into the machine by the player, '*out-of-pocket' or 'reinvestment'* of cashed-out winnings, (*My cash in*),
2) The total amount of money cashed out of the machines during play (*My cash out),*

3) The total accumulated amount the player either won (+) or lost (-) (e.g. *cash-in* minus *cash-out*) over a specified period *(Up/Down),* not including any winnings that the player did not cash out of the machine.

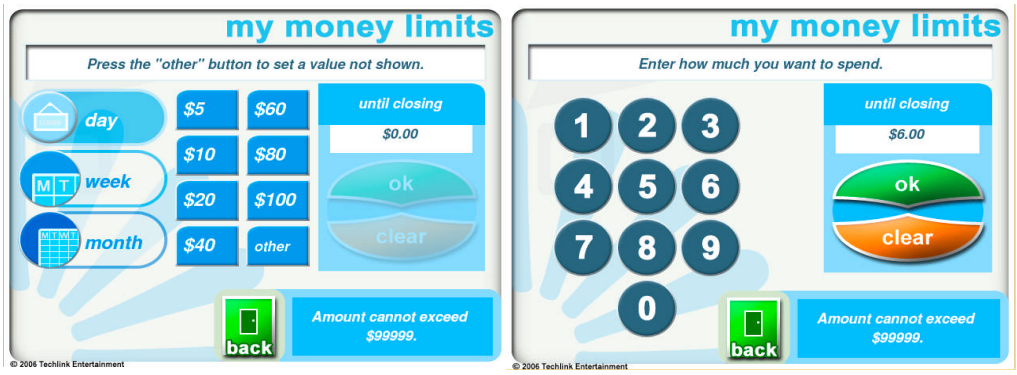
The player could select either a daily, weekly, monthly, or a yearly summary period. '*My Account*' was a voluntary feature that was activated by touching the screen. An additional screen touch was required to bring up the values for the time period selected and a final screen touch closed the feature once a player had finished viewing the information.

1.3.2 Live Action Monitoring (Information Feature)



Live Action was similar to the Account Summary feature but displayed *cash in, cash out and the amount up or down* for the specific session being played. There was also an entry for money the player still had '*left*' on the machine (*Machine balance*). Live Action also displayed the status for any other RG feature the player may have activated regarding money limits.

1.3.3 Money Limits Option (Control Feature)

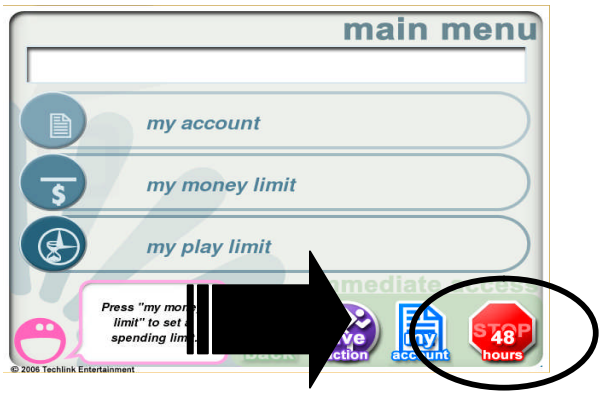


Players could select a specified money limit or choose an alternative value by pressing '*other*' and entering a new amount. The money limit could be set for a daily, weekly, or monthly time period or specified only until closing. Once a money limit was set and confirmed by the player the limit could be reduced but could not be increased until the time set for the limit had expired.

1.3.4 Play Limits Self-Exclusion Option (Control Feature)

Players were also able to use the card to self-exclude from play for a set period such *as until closing, until next week*, or *until next month*. Alternatively, the player could select a specific period using a calendar. Once a player had set a period during which time their card would be inactive (e.g. *could not be used to activate a VLT*) he or she would not be able to reduce or revoke the exclusion limit but could extend the time limits if so desired.

1.3.5 '48-Hour' Stop Option (Control Feature)



The 48-Hour Stop feature was located in the same position, lower right-hand side, on each primary RG screen. It allowed players an immediate, easily accessible option to self-exclude over the next 48 hours. This option was reportedly intended to provide a '*cool down*' period for those individuals seeking temporary assistance in interrupting play.

1.4 Data Security and Player Confidentiality

There was no information contained in the player-card database, including demographic information, that identified players nor was there any information in the database that could be used after the fact to generate any such links between the play data and an individual taking part in the trial. The only identifier in any of the data files was a common player card number under which all associated play session data was tracked and stored over the course of the six-month trial. A confidential, technically sophisticated, and proprietary enrolment process, designed by Techlink Entertainment, eliminated the potential for more than one player card per person to be active without compromising player confidentiality. In accordance with Canadian Tri-Council Ethics for conducting research with human subjects, informed consent was obtained from the test-panel subjects (n=158) recruited by Omnifacts Bristol Research during the Stage III research project for their play data to be linked to survey information including risk for gambling problems (PGSI scores), provided such information was used for research purposes only. Again, no identifiers were included in the data files with the exception of the player card

number, which could not be linked to demographic information in any way.

2.0 METHODOLOGY

The purpose of the current research was to assess the behavioral impact of the RG features with the expectation that such information will be used as input to the decision process regarding further development of the RG system for video lottery in the province of Nova Scotia. To ensure that the results of the investigation were actionable, a framework was established to operationally define the information goals. This framework was used to build the analysis plan.

2.1 Analysis Plan – Setting Outcomes Measures

Focal identified two key criteria for guiding the research process:

1. **Is there value for the customer (VLT Players) in introducing this RG system?**

    a. **Did a significant proportion of players adopt use of the system/features?**
        i. *Trial of feature by player segment and by risk*
        ii. *Adoption of RG Use*

    b. **Did RG features provide on-going value to the player?**
        i. *Persistence of use over time*
        ii. *Differences in on-going use by player segment or by risk*

    c. **What benefit/value was derived from RG use?**
        i. *Game impacts for players*
        ii. *Persistence of game impacts over time*
        iii. *Differences in game impacts among player segments and by risk*

Although use of the player card was mandatory, use of the features was voluntary. Trial can occur due to curiosity and/or in response to a need or desire for information or control. However, presumably, customers are receiving value if they continue to choose to use the feature. Determining the take-up rate (e.g. *trial*) and persistence of use (e.g. *continued adoption*) were used to assess value to the customer. Assessing the impact of

RG use, including impacts for entertainment value, provides information regarding the type of value or benefit the customer is receiving from feature use. This means including assessment of the overall play experience and play value (e.g. *wins, losses, cash-back*) relative to time and money spent rather than simply testing for reductions in time and money.

2. Is the behavioral impact of the RG system consistent with NSGC's goals to assist players to gamble responsibility?

a. What behaviors are being targeted by the features?

i. *Time and money management and control (e.g. staying on budget, avoiding increased activity versus increased expenditure)*
ii. *Reduction in time or money spent*
iii. *Assistance in stopping or eliminating play*

b. What are the impacts of RG use (behavior and outcomes)?

i. *Identification of behaviours (e.g. play-session characteristics) that changed after use*
ii. *Impact of changes for key indicators such frequency of play, length of play, and expenditure*

c. Do the impacts vary by risk for gambling problems?

i. *What are the impacts, implications for players in general?*
ii. *What are implications of use by those at risk for gambling problems?*

Some customers may derive value from the features but it is also critical to assess the nature of that value. For example, allowing customers to use their debit card to wager on a gaming machine may provide value to a number of customers (e.g. *convenience*) and be associated with persistent use, however, the cumulative outcome of use (e.g. *increase in amount spent*) may be inconsistent with RG goals and will be rejected on these grounds. RG impact, positive and negative, must be assessed for all players in order to meet duty of care and due diligence requirements prior to initiating change.

Thus, while it may be considered necessary and desirable to ascertain outcomes for a designated proportion of the player base (e.g. *20% reduction in expenditure among 10% of the target group*) it is equally important to assess the impact for the other 90% of a group or players in general that will be exposed to the features. This allows NSGC to evaluate the performance of the system in the context of overall responsible gaming strategies and goals set for the province and to move to next steps with an action plan for on-going evaluation and decision-making. It also ensures that RG performance is being examined for unanticipated impacts and outcomes.

This framework was used to design the research plan for analyzing the player-cardbase..

2.2 Research Design and Rationale

Once the criteria framework was established the data system files were examined in detail to identify and test various options for best addressing the information goals of the analysis. To expedite this demanding and iterative process in a timely manner, the data technicians and engineers at Techlink Entertainment assisted by generating variables and new system data files under the guidance and direction of the analysts at Focal Research. Despite this valuable, operational cooperation, all data analysis and output for the study was conducted and held independently by Focal Research and remained confidential throughout the research process.

There were a number of critical issues identified in designing the analysis approach.

2.2.1 Re-Defining the Role of Responsible Gaming Features

It was important when designing the analysis to clearly define the purpose and goal of the RG features being tested as related to the information available in the player database as this determined what measures were used to assess the impact of RG use and whether or not the features were successful in meeting the criteria set for moving forward.

In the past, success indicators had focused on assessing impact in achieving desired outcomes, especially reductions in expenditure and session length. It is challenging, using traditional research methods, to generate survey data that has sufficient precision to, conclusively, detect

change. As a result, it is often costly and difficult for gaming managers to obtain timely, conclusive, impact research to meet, evidence-based decision requirements. The availability of player-card data offers a new means of managing and informing the decision process.

Responsible gaming initiatives typically are comprised of options or features provided to assist players in managing their gambling and making informed decisions about their gambling. **Therefore, Focal identified two core elements of responsible gaming initiatives as the extent to which such initiatives:**

1. **Motivate Players to act to change and/or control behavior *(e.g. motivation to reduce amount spent);* and,**

2. **Provide the system, structure, and information resources to facilitate that process.**

In the case of the current study, the features were not structured to '*reduce the amount of time or money*' spent gambling per se. Instead the features were specifically designed to assist players in tracking and controlling expenditures (e.g. *money spent*) through optional ***information features*** which can serve to inform and '*motivate*' players to stay on budget, and optional ***control features*** to help players manage expenditure **if** they are motivated to use the feature (e.g. *once they are motivated to control their spending a player can use the system to apply pre-set money limits to help them stay on track*). Therefore, people who adopt use of the RG features can be expected to do so for a variety of reasons including increasing informed decision-making (e.g. *a desire for information about their gambling in order to make better decisions*), controlling, and/or reducing their gambling.

There was also self-exclusion options for those individuals seeking assistance with stopping or eliminating play. Previous research indicated that such features target a distinct yet small group of players, suggesting measurement of impact for this feature among the general population of players is likely irrelevant. '*My Play Limit*' for weekly, monthly, or calendar designated restriction periods, and the '*Stop 48 Hour*' feature are the only features specifically designed to impact frequency of play. Yet, only about 2% of players (n=17) in the trial activated these

features even once. To evaluate the value of the exclusion RG feature requires specific research with the target group of players seeking assistance in stopping or reducing play, primarily a distinct sub-segment of individuals having trouble with their gambling.[6]

For the current set of features being tested, reduction in time spent gambling also does not appear to be a relevant target outcome as none of the features was specifically designed to produce reductions in session length. In fact, setting money limits could randomly produce increases in session length; some people will get to play longer and some for shorter periods for the same amount of money due to the impact of random wins and losses in extending or shortening play. However, this does not mean that session length is not a critical outcome to assess. It is important to determine the impact of RG use for changes in session length but it is likely not effective to set '*reduced session length*' as an outcome target for the features being tested.

Therefore, given the characteristics of the RG features and the nature of player-card data, new measures for assessing behavioral impact were defined for analysis using the player-card data. Measures of frequency of play, session length, and expenditure were still incorporated as important game outcomes. However, achieving reductions in these measures were not set as key indicators of feature success. Instead, the success of the RGD System centered on identifying the association of RG use with improved game outcomes that provide value to the consumer and were consistent with NSGC goals for responsible gaming.

2.2.2 New RG Impact Objectives

Use of player-card data meant that new impact objectives could be set for measuring the behavioral effects of the RG features. Again, with survey data this is not possible since outcomes (e.g. *amount of money or time spent playing*) are self-reported as a summary of total play. Using player-card data allowed outcome measures to be linked to RG feature

[6] Refer to the Nova Scotia Video Lottery Self-Exclusion (VLSE) Concept Testing (Focal Research, 2003) and NS VLSE Process Test (Focal Research, 2004) conducted for NSGC and the NS Joint Committee on Video Lottery Self-Exclusion for detailed analysis surrounding the target group most likely to access exclusion options (www.gamingcorp.ns.ca/pdf/NS%20VLSEP%20Final%20Report%20_Jan%2011_.pdf).

performance based on hypotheses about how such features would influence players. It was also considered important to assess play value and whether feature use contributed to improved play outcomes or detracted from game outcomes. In addition to measuring frequency of play, length of play and expenditure, new variables were selected to focus analysis in other areas expected to be influenced by the features such as changes in *cash-out* (absolute dollars taken out of the machine during play), *rate of cash-out* (cash-out as percent of cash-in), *wins versus losses* (absolute dollars and percentage), *percent of winning sessions*, (sessions ending in '*cash-up'*), *percent of losing sessions* (sessions ending in '*cash-down*'), *rate of play* (number of '*pulls/spins*' per hour).

2.2.3 Randomness in the Player-card

In contrast to player-card data, self-reported survey data does not have to contend with the powerful, random influence of the actual game in determining outcomes. However, when dealing with real play data the majority of outcomes, on a per play-session basis, are determined by the random action of the games (e.g. *how the game is programmed to perform*). Despite how someone plays or the effectiveness of any RG feature, the majority of the variance in real game outcomes, at a per session level, will be determined by random chance and game design. Theoretically, this built-in randomness cannot be influenced by anything else the player does, including the use of RG features. This means there is only a small amount of variance left over that can be explained by any other factor including the use of RG features. Pre-set impact targets based on traditional survey outcomes (e.g. *10% reduction in expenditure by 10% of high risk players*) must be adjusted to reflect criteria standards that are relevant for detecting changes in real play behaviors (e.g. *small variance explained, a need to increase the power of detecting differences*. There is a need to balance the reduction of Type II error (e.g. *failing to detect a difference when there is one= reduced power*), as well as, reducing Type I error (e.g. *saying there is a difference when there is not=reduced rigor*).[7] This also means that in order to

[7]For an excellent discussion on balancing the tension between Type I and Type II Error see Research Methods Knowledge Base by William M. Trochim, Cornell University (Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://trochim.human.cornell.edu/kb/index.htm> Version current as of January 16, 2005) "Increasing alpha (e.g., from .01 to .05 or .10) increases the chances of

appropriately assess target outcomes such as those pre-set for the current study, a significant amount of play session data is needed and it then must be summed for individual players over time before being combined to calculate the overall percentage reduction for a specified period. Thus, player-card data for machine gambling is very different from survey data and the greater accuracy inherent in the data also means that analysts must contend with the '*randomness*' built into game outcomes.

2.2.4 Session Data versus Player Data - Selecting a Standard Unit of Measurement

When using player-card data, caution must be exercised in analyzing play sessions versus players. There is a temptation to treat every case in the database file as an independent event. However, this is not the case. Individual players vary in '*how*' they play (e.g. *amount spent and how they respond to game outcomes*) and the number of times they play. Therefore, the play outcomes are accrued and manifested differently for each player. For example, one player may have 10 sessions of play while another has 50 sessions of play; at a per session level the latter player will have 5 times the impact on results. This can be appropriate when examining play session characteristics (e.g. *sessions when an RG is used versus sessions when an RG feature is not used*) but such results cannot be used to infer player characteristics and may produce highly skewed and misleading results.

Unlike survey data which typically represents a one-dimensional summary of the effects of play (e.g. *one measure, at one point in time*), player-card data is three dimensional in nature having depth and breadth, over time. This allows for comparisons of outcomes relative to the action of the game and provides opportunities to examine impacts (e.g. *impact when losing, impact when winning*) that are not possible with one-dimensional survey data. However, this also means

making a Type I Error (i.e., saying there is a difference when there is not), decreases the chances of making a Type II Error (i.e., saying there is no difference when there is) and decreases the rigor of the test. However, increasing alpha (e.g., from .01 to .05 or .10) increases power because one will be rejecting the null more often (i.e., accepting the alternative) and, consequently, when the alternative is true, there is a greater chance of accepting it (i.e., power)".

that, unlike survey data, there isn't a standard unit of comparison for every player. This standard unit must be set and then generated for each player before the results can be analyzed at a total level otherwise the results will simply occur as a function of those contributing the most play sessions for the unit being measured (e.g. *dependent data*). Thus, it is inappropriate to combine play over an arbitrarily fixed time such as week or month without taking this '*frequency bias*' into account. This means that if one wants to make conclusions about player behaviors and characteristics then the data must first be summarized for individual players over all of his/her play sessions of interest to ensure independence before it can be analyzed at a total or segment level.

This is also necessary in dealing with the impact of outliers. Player-card data represents 'real' data insofar as real behavior is being recorded, stored and analyzed. Sometimes people play more and sometimes people play less. Eliminating outliers from the data files can result in excluding information that may have significant implications for understanding those conditions under which extreme outcomes occur, although obviously, at a segment level such behavior can be expected to skew results. This can be addressed by averaging play behaviors on an individual level before generating segment or '*period*' averages (e.g. *using an average of averages for reporting play behaviours on a weekly or monthly basis*). Regardless, there is still a need for defining a common unit of play measurement for comparison purposes

In setting the standard measurement, the unit of play must be relevant to all players regardless of frequency, duration, week, month, year, or any other potentially confounding factor.

For the purpose of this analysis, the common unit selected was '*day-session*' of play.

2.2.5 Day Session versus Card Session

Each time the player card was inserted into the machine and removed, a set of player data was generated for each of 40 variables tracked by the RG system. This represented a '*card-session*' but may or may not have represented an actual play session; sometimes players simply activated the machine without playing or players cashed out and then continued to play. As a

result, '*card-sessions*' varied strongly in nature and degree among players and analysis based on card-sessions will produce distorted findings. In order to make meaningful comparisons it was necessary to use a common, logical, and more natural unit of comparison. For analysis purposes, the unit of play selected was **'***day-site session'*. This assumed that all sessions that occurred at a particular site over a single day comprised a single play session. The data for each card-session, that involved at least one wager or play, was summed for each site played at on a single day. This new variable was used to establish the common unit of analysis for each player. This level of measurement was applicable to all players, and could be summed, and analyzed independently of '*when*' the session occurred during the trial. The additional value of a day unit was that the minimum time period that could be set for the majority of RG features was at a daily level and, therefore, the feature would only have had to be set once during a single day session in order to be in effect over this common session. Throughout the report, the use of the term '*session*' refers to a ***day-session of play*** unless otherwise specified.

2.2.6 Dealing with Different Play Periods among Players over the Course Of the Trial

The power of player-card data increases over time (e.g. *more measurement periods*) and as the sample of players represented in the database increases (e.g. *more players*). In the current study the data was limited to those players in the test area who played over the course of the six month trial (n≈,856), of which only 873 played at least once a month or at least six times during the test period. Given this limited, finite sample, it was important to maximize player participation in order to maximize the power of the analysis in conclusively addressing study objectives. Players could stop and start playing at any time over the trial and differed as to when they tried and/or continued to use the RG features. This is a normal characteristic of play to be considered in the analysis design. Consequently, measures were generated relative to trial of the RG features and not based on any fixed period (e.g. *specific week or month*). This allowed all players to be qualified for participation, thereby adopting a more naturalistic and inclusive approach to analysis and removing any bias introduced by selecting only those who took-up play early in the trial process.

2.2.7 Defining an RG Session

The RG features were triggered by the player hitting the touch screen twice; once to bring up the option screen and once to activate the feature information. This security feature minimized triggering of confidential information by players or spectators accidentally touching the screen. However, this also meant that a minimum of two hits was required to trigger the actual RG feature. Given the positioning of the RGD on the terminal, accidental triggers could occur during the course of normal play. However, for analysis purposes it was important that only those sessions in which actual feature use occurred were used to define an RG session. In consultation with the project's system engineer at Techlink Entertainment, (R. MacNeil), an RG session was operationally defined as any day-session which involved a minimum of three screen hits. This approach was conservative but reduced the likelihood of '*false positive*' classifications (e.g. *incorrectly assigning an RG session of play*) and increased the certainty that all events categorized as RG sessions would include exposure to at least one of the RG features. Such an approach was also perceived to increase the rigor of the analysis and improve the sensitivity of the RG impact analysis in modeling differences.

2.2.8 Pre-Exposure Benchmarks

The primary challenge in measuring changes in behavior was the lack of a benchmark measure prior to the introduction of the RG system; there was no player data gathered before the RG features were activated. This meant that the data gathered by the system over the course of the trial had to be used to generate reasonable and reliable pre-measure data for comparison to reasonable and reliable post-measures of behavior. This issue was further complicated by the fact that, although all players were exposed to the RG features, actual use was self-selected. There was likely to be significant differences between those players who tried but did not continue to use the features (Trial Players), those who adopted the use of the features after trial (Adopters) and those who did not even try the features during the measurement period (No-RG Players). Presumably, part of the difference in trial and adoption was due to differences among players in the need and/or desire for play controls; not all players needed and/or wanted to

manage their VLT play. To control for these differences it was necessary to ensure that other player groups (Trial and No-RG Players) could be formed using similar criteria for comparison to those who took up and continued to use the RG features (RG Adopters). Moreover, the criteria set for the pre-measures needed to be based on reasonable, testable theory that maximized the number of players qualifying for inclusion in the impact testing yet discriminated between those who actually adopted play versus those that had simply tried the features and either subsequently rejected or were not motivated to continue use.

2.2.9 Defining RG Adoption

As noted above, in order to test the impact of the RG features it was necessary to set criteria that would distinguish those who adopted use of the features from those who did not in order to have a test and control group for comparison. Play profiles were examined based on the level of RG use by an individual player. It was found that those who tried out the features only once or twice over the course of the trial differed significantly from those that continued to use the features more frequently. It was also assumed such relatively limited exposure to the features (e.g. *use in one or two play sessions*) would have minimal influence for play behaviors over time. Under the assumption that continued use of the features indicated that the customer was receiving some kind of value, this characteristic was also used to establish the criteria for classification as having adopted play rather than just having tried out the RG features.

Essentially Adopters were defined as those players who played at least six times during the course of the trial and used at least one RG features three or more times during the that period. Trial players were defined as those who tried the features once or twice but did not exhibit continued use over the same measurement period.

2.2.10 Selecting the Player Sample for Analysis

In total, 1,854 different people played VLTs at least once in the Windsor area during the trial. Of these total adults, 53% (n=983) were characterized as Casual Players (e.g. playing less than once per month), with fewer than six play sessions over the course of the six months. This

group collectively accounted for about 7% of the total day-sessions of play and only contributed about 6% of total VLT revenues during the trial. On average, adults characterized as Causal Players only played the machines twice during the trial, which meant that they did not play enough to qualify on the various criterion outlined previously for inclusion in the analysis. Play behaviors for this group differed significantly from those who played more than six times. The results indicated that Casual Players had limited exposure to the features, little experience in use, and were unlikely to be candidates for the product at this time given their low play levels and low current requirement for control features. Casual Players was excluded from further impact analysis as their inclusion in the data would distort the findings due to the large size of the group although this group was included in assessment of RG impact by risk for gambling problems.

Those who played 6+ times over the course of the trial were characterized as Regular Players (n=871). This group comprised 47% of the total player base yet accounted for the vast majority of the play '*day-sessions*' (≈28,000 sessions: 93%) and, not surprisingly, the vast majority of revenues (94%) generated during the trial. On average, Regular Players had about 30 play sessions over the six months, ranging from lows of 6 sessions to highs of 200+ sessions. Given frequency of play, session length and other indicators, the Regular Players were considered the primary target group and selected as the appropriate sampling frame for testing adoption, and in generating experimental, and control groups for comparative purposes.

2.3 Sample Design

All players included in the analysis had to have played at least six times over the course of the trial to ensure there were sufficient day-sessions of play available for evaluative purposes. This number was selected based on criteria for distinguishing regular from casual playing patterns as well as the minimum number of day-sessions of play required to create reasonable pre and post-measures to test for changes in behavior.

The player-card data for Regular Players (n=871) was examined and then classified into three primary sub-segments based on interaction with the RG features (*RG Adoption, RG Trial, No-*

RG Use) and whether or not it was possible to generate pre-post measures for testing the impact of RG exposure (*Testable versus Non-Testable*).

The number of day-sessions selected for generating a pre-session benchmark was three; all those who had at least three day-sessions of play before trying any of the RG features and at least three post day-sessions of play, including the trial session were included in the pre-post testing for impacts. As a control, a pre-measure benchmark was also created for the No-RG Use group. The first three day-sessions of play were used to establish the baseline and the remaining 3+ day-sessions became the post-comparison. The results for this No-RG Players group (Control Group) were primarily used for comparison with the RG Adopters (Experimental Group). This allowed for testing of changes that may have occurred normally over the course of the project or as a function of research design.

Player Classification:

A. RG Adopters

(n=414; 22% of Total Players; 48% of Regular Players; 61%play sessions; 61% of net revenues)

- used RG features at least three or more times during the trial
  1. **Testable RG Adopters (n=122; 7% of total players; 14% Regular Players; 24% of play sessions and 20% of net revenues)**
     - *able to generate pre-post measures (had at least 3 sessions of pre trial play and at least 3 sessions of play using RG features)*
     - *comprised 'Experimental' Group*
  2. **Non-Testable RG Adopters (n=292; 16% of players; 34% Regular Players; 37% of play sessions and 42% of net revenues)**
     - *post-trial measures only (not able to generate 3 sessions of pre trial play)*

B. RG Trial Players

(n=210; 11% of total players; 24% of Regular Players; 17%play sessions; 17% of net revenues)

- tried the RG features one or two times during the trial

1. **Testable Trial Players**

   (n=92; 5% of players; 11% Regular Players; 10% of play sessions and 9% of net revenues)

   - *able to generate pre-post measures (had at least 3 sessions of pre trial play and at least 3 sessions of post-trial play, including 1-2 sessions using RG features)*
   - *comprised 'Experimental' Group*

2. **Non-Testable Trial Players**

   (n=118; 6% of players; 14% Regular Players; 8% of play sessions and 8% of net revenues)

   - *post-trial measures only (not able to generate 3 sessions of pre trial play)*

C. No-RG Players:

(n=247; 13% of total players; 28% of Regular Players; 15%play sessions; 15% of net revenues)

- Never tried the RG features during the trial
- Had at least 6 sessions of play during the trial
  - *first three sessions of play were used to generate pre-measures and the subsequent 3+ session comprised the post-measures*
  - *comprised 'Control' Group*

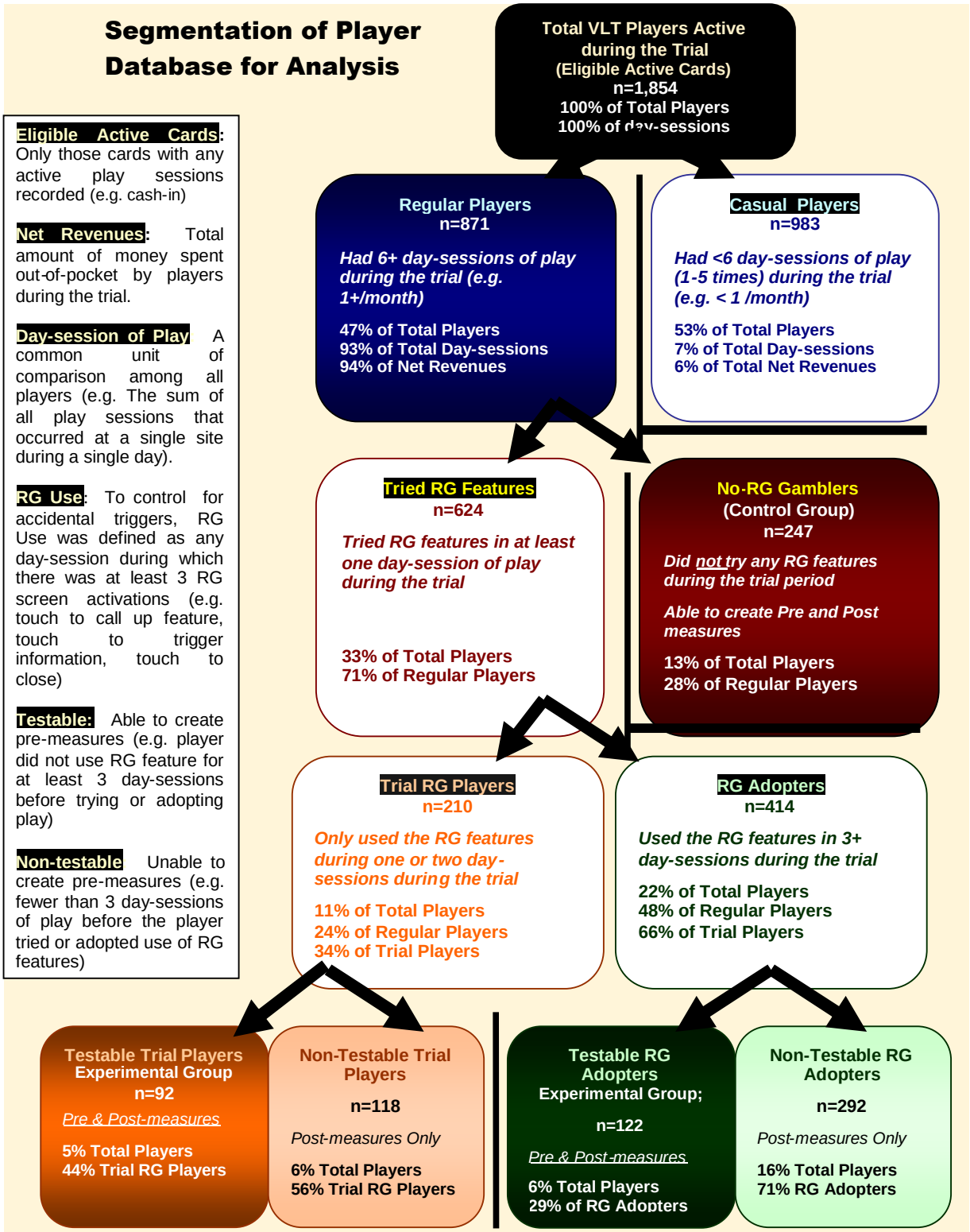

Segmentation of Player Database for Analysis
Eligible Active Cards: Only those cards with any active play sessions recorded (e.g. cash-in)
Net Revenues: Total amount of money spent out-of-pocket by players during the trial.
Day-session of Play A common unit of comparison among all players (e.g. The sum of all play sessions that occurred at a single site during a single day).
RG Use: To control for accidental triggers, RG Use was defined as any day-session during which there was at least 3 RG screen activations (e.g. touch to call up feature, touch to trigger information, touch to close)
Testable: Able to create pre-measures (e.g. player did not use RG feature for at least 3 day-sessions before trying or adopting play)
Non-testable Unable to create pre-measures (e.g. fewer than 3 day-sessions of play before the player tried or adopted use of RG features)
Total VLT Players Active during the Trial (Eligible Active Cards) n=1,854 100% of Total Players 100% of day-sessions
Regular Players n=871
Had 6+ day-sessions of play during the trial (e.g. 1+/month)
47% of Total Players
93% of Total Day-sessions
94% of Net Revenues
Casual Players n=983
Had <6 day-sessions of play (1-5 times) during the trial (e.g. < 1 /month)
53% of Total Players
7% of Total Day-sessions
6% of Total Net Revenues
Tried RG Features n=624
Tried RG features in at least one day-session of play during the trial
33% of Total Players
71% of Regular Players
No-RG Gamblers (Control Group) n=247
Did not try any RG features during the trial period
Able to create Pre and Post measures
13% of Total Players
28% of Regular Players
Trial RG Players n=210
Only used the RG features during one or two day-sessions during the trial
11% of Total Players
24% of Regular Players
34% of Trial Players
RG Adopters n=414
Used the RG features in 3+ day-sessions during the trial
22% of Total Players
48% of Regular Players
66% of Trial Players
Testable Trial Players Experimental Group n=92
Pre & Post-measures
5% Total Players
44% Trial RG Players
Non-Testable Trial Players n=118
Post-measures Only
6% Total Players
56% Trial RG Players
Testable RG Adopters Experimental Group; n=122
Pre & Post-measures
6% Total Players
29% of RG Adopters
Non-Testable RG Adopters n=292
Post-measures Only
16% Total Players
71% RG Adopters

Table 1: Player Segment Database Characteristics

Segment	Total Players		Day-Site Sessions		Revenue
	n	%	n	%	% Money Lost
Total Players (Played any sessions During Trial)	**1,854**	**100%**	**29,997**	**100%**	**100%**
Casual Player *(Played < 6 sessions during trial)*	*983*	*53.02%*	*1,990*	*6.63%*	*6.43%*
Regular Player *(Played 6+ sessions during Trial)*	*871*	*46.98%*	*28,007*	*93.37%*	*93.57%*
Regular Player Segmentation:					
Testable Adopter *(Adopted RG play (3+ Usage); Had Pre-Post measures)*	*122*	14.01%	*7,123*	23.75%	*19.58%*
Non-Testable Adopter *(Adopted RG play (3+ Usage); Had Post measures only)*	*292*	33.52%	*11,116*	37.06%	*41.51%*
Testable Trial *(Tried RGs (1-2 Usage); Had Pre-Post measures)*	*92*	10.56%	*2,872*	9.57%	*9.14%*
Non-Testable Trial *(Tried RGs (1-2 Usage); Had Post measures only)*	*118*	13.55%	*2,323*	7.74%	*7.89%*
No-RG Player *(Did not try any RGs)*	*247*	28.36%	*4,573*	15.24%	*15.45%*

2.4 Analysis Approach

First, the original player-card database was examined and sets of new data files and variables were created in order to produce the necessary summary data for testing purposes.

Once new data files were generated and cleaned there were six primary analyses undertaken:

- Testing of the project assumptions and segmentation design to ensure the validity of the approach adopted;
- Segmentation analysis to profile and compare between player characteristics and outcomes by player segment and adoption segment (Adopters, Trial Players and No-RG Players);

- Trend analysis to assess adoption rates and the persistence of behavior over time by adoption and by RG use (RG sessions versus Regular (Non-RG) sessions);
- General Linear Modeling (GLM) for Repeated Measures to detect changes associated with use of the RG features;
- Association analysis to develop variables associated with risk for problem gambling
- Logistic Regression to develop behavioral models to identify risk.

Each analysis is discussed in Section 3.0 Results.

Given the objectives of the RG features and the need for information to shape policy and program decisions, the risk of failing to detect a positive or negative impact also had significant implications for the various stakeholders looking to such research to assist in informing the decision process. Therefore, all significant differences were reported at the 90%+ Confidence Level ($p \leq .10$, $p \leq .05$, $p \leq .01$) to minimize the occurrence of Type I and Type II error and increase the power of the tests to detect meaningful change while maintaining sufficient rigor to avoid spurious results.

Various descriptive and multivariate statistics and analytical techniques were used in the analysis for this study including:

- Chi square tests for distribution comparisons,
- Z-tests and/or independent t-tests for mean comparisons,
- Two tailed tests for comparison of proportions (unless otherwise indicated),
- Mann-U-Whitney tests for median comparisons,
- Correlation Analysis (Pearson for interval level data, Spearman for rank ordered data) to identify relationship between the dependant and independent variables,
- Factor Analysis (PCA) to examine variable loadings and for data reduction purposes,
- Dependent t-tests and uni-anova tests for detecting within-subject differences over time,

- ANOVA (GLM) with covariates for repeated measures to identify the effects of RG use on changes in expenditure and for assessing interactional effects by risk for problem gambling,
- Logistic Regression and Association Analysis for developing behavioral models to predict risk for problem gambling

All analysis was conducted using SPSS version 11.0 or 13.0.

2.5 Limitations

As with all research, there are limitations that must be acknowledged in the interpretation and application of the findings. This study is no exception, although it should be noted that player-card data itself represents the most accurate source of VLT behavioral data available for analysis. Even with technological system glitches and player card sharing, the amount of error inherent in the data is small (≈5-6%) especially when compared to other behavioral data sources such as self-reported survey estimates. It should be kept in mind that analysis of the data contained in the player-card database is exclusive to those players who took part in VLT gaming in the test area during the trial period. Therefore, it was not possible to use this data source to assess changes in behaviour that may have occurred before and after the RG System became mandatory (*e.g. the number of players that stopped or reduced play in response to mandatory use of a player card*).

As the first study in the world to collect VLT player-card data there is much to be learned from this rich, unique dataset, however, in the current study focus was restricted solely to using the database in an attempt to isolate and identify relevant impacts of the RG features tested during the trial. This was challenging, primarily due to the lack of a baseline measure of behavior established prior to implementation of the features and lack of information regarding player risk for those playing the machines during the trial. For those players active during the trial, it was necessary to generate pre-post measures. While the establishment of benchmarks was developed systematically and rationally, the impact of RG use could only be statistically modeled among those players for whom a baseline measure could be created. Thus, there was

some uncertainty as to whether the same effects would have been observed for all players. This uncertainty was diminished through the identification of similar trends and signature RG play when profiling differences in RG versus non-RG play sessions even among those who immediately adopted use of the features (e.g. those players for whom baseline measures could not be calculated). It was also possible, using the player-card data and a variety of analytical techniques, to identify impacts that were associated with feature use, although direct causality was difficult to ascribe with certainty and the length of the trial (six months) pre-empted any assessment of longer-term impacts.

There were also issues related to the assessment of RG impact by risk for problem gambling, primarily related to the need to develop a model for identifying risk. Given that risk assessment for problem gambling *(*e.g. *CPGI scores)* was only available for 140 test-panel members, there was not enough data for using a hold-out sample to test for a positive bias in the predictability of the derived equation *(e.g. model).* However, the Principal Investigators for the study were able to draw on experience with analysis of other gambling machine databases and customize previous learning for use with this particular dataset. Notwithstanding these limitations, the risk segmentation yielded two groups that had distinctive playing patterns consistent with respective risk profiles (e.g. *lower versus higher-risk players*). The exploratory analysis provided sufficient insight as to the impact of the features to be of assistance in future planning.

It should also be noted that although principals at Focal Research have been proponents of technology-based RG solutions, the source for this support is evidence-based and research driven[8]; the Principal Investigators are not aware of any current conflicts of interest that would impact objectivity or the ability to execute project responsibilities. Focal Research is an independent research firm and derives no direct benefit from the success or failure of the current RG system under study or that of any other related or competitive product.

[8] See 1998 Nova Scotia Regular VLT Players Study and 2000 Follow-up Study, Nova Scotia Department of Health (http://www.gov.ns.ca/heal/reports), 2001and 2003 NS Responsible Gaming Features Research , Nova Scotia Gaming Corporation (http://www.nsgc.ca/reOther.php), 2004 Nova Scotia VLT Self-Exclusion Process Test, NS Video Lottery Self-Exclusion Joint Committee (http://www.gamingcorp.ns.ca/pdf/NS%20VLSEP%20Final%20Report%20_Jan%2011_.pdf)

The initial database review, interim analysis and report, as well as, the Draft and Final Reports were subject to independent evaluation by two reviewers; Dr. J. McMullan and Dr. H. Wynne. Written reviews were submitted to NSGC. Any items identified by the peer-reviewers were addressed either directly in the report or separately. The feedback and commentary provided by these reviewers made a valuable contribution to the quality and clarity of the final reporting process.

3.0 RESULTS

An important component of the analysis process was continual validation of methodological assumptions. The database was used as a resource in setting the various parameters for segmenting and analyzing the data. An iterative approach was used throughout the process to build upon learning at each stage of the analysis. The sheer volume of exploratory analysis conducted throughout the course of working with the database, pre-empted detailed reporting of all outcomes. Instead, results focused on the key findings at each step in addressing the criteria framework set for the current project.

There are eight primary analyses used for profiling and comparisons:

- **Total Regular VLT Players (n=871)**: Profile of use of the RG Features.
- **Total RG Adopters (n=414) versus No-RG Players (n=247):** Between-group analysis to identify differences in overall play behaviors and game outcomes, *on a per player basis*, among all those who used RG features 3+ times (Adopters) versus those who did not use any of the features during trial (No-RG Players).
- **Trend Analysis among Primary Player Adoption Segments**: Between-group comparison of within-group trend analysis for key behavior and game outcomes *at a per session level*.
- **Total RG Sessions versus Total Non-RG (Regular) Sessions for 18+ Session Adopters Only (n=288)**: Among those Adopters, who played 18+ times during the trial, a comparison of session characteristics when they used the RG features versus those sessions when they did not in order to identify within-group differences in behaviors and outcome over time.

- **Profile of Testable Adopters (n=122; Pre-Post Measures) versus Testable No-RG Players (n=247; Pre-Post Measures)**: Between-group analysis of comparative change in overall play behaviors and game outcomes from pre to post RG adoption.

- **Impact analysis to determine the effect of RG use for key outcome targets (e.g. *player expenditure*, *cash-out, wins*):** General Linear Modeling (GLM) (ANOVA for Repeated Measures) using pre-post comparison for Testable RG Adopters (n=122) versus No-RG Players (n=247).

- **Development of a behavioral model to predict risk for problem gambling among all players (n=1,854) in the database in order to assess the impact of RG use for high risk Players:** Association analysis to develop new variables, correlation analysis using the test-panel data to test the relationship of the new variable to risk (PGSI score; n=140) and Logistic Regression Analysis to use new variables to derived an equation to segment the player database into lower-risk (n=1,100) and higher-risk groups (n=724).

- **Impact analysis to determine the effect of RG use for key outcome targets for Lower-Risk (LR) Players versus Higher-Risk (HR) Players (e.g. *player expenditure, cash-out, wins*):** General Linear Modeling (GLM) (ANOVA for Repeated Measures) using pre-post comparison for Lower-Risk Players (LR Testable RG Adopters: n=73 versus LR No-RG Players : n=157) versus Higher-Risk Players (HR Testable RG Adopters: n=49; HR No-RG Players: n=90).

Key Population Segments

Table 2: Total VLT Players Database Profile

Population Player Segment	Total Players		Day-Site Sessions		Revenue (Money Spent)
	n	%	n	%	%
Total Players (Played any sessions During Trial)	1,854	100%	29,997	100%	100%
Casual Players (Played < 6 sessions during trial)	***983***	***53.02%***	***1,990***	***6.63%***	***6.43%***
Regular Players (Played 6+ sessions during Trial)	***871***	***46.98%***	***28,007***	***93.37%***	***93.57%***

In total, 1,854 adults actively played any VLTs in the Windsor Area during the field trial with almost 30,000 day-sessions of play recorded over the six-month period. Play activity was heavily skewed towards the regular players, defined as having played six or more times during the trial.

While regular players only accounted for slightly under half (47%) of total VLT Players in the test area, this group contributed almost 93% of total day-sessions of play and, correspondingly, 94% of total revenues. Due to a number of related methodological considerations the primary segment of interest for analysis purposes were those Players who played six or more times over the course of the test period. The use of this criterion for analysis was borne out by the distinct differences observed between the two player groups based on the '*six-session*' segmentation. The other half of the player base active during trial (53%) collectively contributed about 2,000 play sessions and about 6% of revenue. This also underscored the need to assess the relative contribution of each player when conducting analysis rather than treating all sessions as equal and averaging over the player base. If such an approach were used then the results would suggest, on average, VLT Players played 16 times over the course of the trial; in reality half of the players played about 2 times (Casual Players) and the other half, on average, played about 32 times over the course of the trial (Regular Players).

Key Regular Player Segments

Table 3: Regular VLT Player Database Profile

	Total Players		Day-Site Sessions		Revenue (Money Spent)
Regular Player Segmentation:	**n**	**%**	**n**	**%**	**%**
Testable Adopter *(Adopted RG play (3+ Usage); Pre-Post measures)*	*122*	6.58%	*7,123*	23.75%	*19.58%*
Non-Testable Adopter *(Adopted RG play (3+ Usage); Post measures only)*	*292*	15.75%	*11,116*	37.06%	*41.51%*
Testable Trial *(Tried RGs (1-2 Usage); Pre-Post measures)*	*92*	4.96%	*2,872*	9.57%	*9.14%*
Non-Testable Trial *(Tried RGs (1-2 Usage); Post measures only)*	*118*	6.36%	*2,323*	7.74%	*7.89%*
No-RG Player ***(Did not try any RGs during trial)***	*247*	13.32%	*4,573*	15.24%	*15.45%*
Total Regular Players	***871***	***46.98%***	***28,007***	***93.37%***	***93.57%***

Within the regular player base, each player was then assigned to a player category based on his or her involvement with the RG features.

To reiterate, Adopters were defined as those players who used any of the RG features on at least three separate days or occasions of play during the trial. This group was further broken down into the Testable Adopters (*those who had at least 3 day-sessions of play before they tried any of the RG features and for whom a pre-exposure baseline could then be generated*) versus Non-Testable Adopters (*those who had less than 3 sessions of play before trial of the features which pre-empted the creation of a baseline pre-measure*).

Testable Adopters only represented ≈7% of all those who gambled during the trial but this group logged almost one-quarter of all the play sessions and contributed almost 20% of the net revenue (e.g. *money spent*). However, it was noteworthy that over the course of the trial this

heavy player segment, which adopted the use of the RG features, was the only player segment to under-represent in terms of revenue contribution relative to the number of sessions played.

Sample sizes and group statistics for each of the player groups that emerged from the research design and analysis plan generated were considered relevant and reasonable for proceeding with the proposed analysis.

3.1 Adoption of RG Features (Value for the Customer)

An important test of the value for consumer in introducing the RG system is the extent to which the players were willing to try any of the components of the system and then continued to use the components over time.

3.1.1 Use of RG Features among Regular Players

Table 4: Percent of All Regular Players Using Each Feature

RG Feature	Regular Players (n=871)
Live Action	59.2%
My Account (Any)	68.3%
My Account Day	48.9%
My Account Week	40.4%
My Account Month	39.0%
My Account Year	40.4%
Money Limit Day	11.1%
Money Limit Month	0.5%
Money Limit Year	0.6%
My Play Limit Day	1.5%
My Play Limit Week	0.0%
My Play Limit Month	0.2%
My Play Limit Calendar	0.0%
Stop 48	2.0%

Overall, trial of the RG features by Regular Players in the test area was high, in particular for the '*information features*' as compared to the '*control features*'.

Almost 70% of Players accessed '*My Account*' at some point during the trial, with about 60% having activated the '*Live Action*' screen. Access of any of the '*My Account*' screens including *day, month, or year* options was similar suggesting these summary points were relevant and reasonable for players.

As predicted, use of the control features was lower, although about 11% of Players (n=97) set a '*daily money limit*' at least once during the trial, with about five people having set a monthly and or yearly limit for their VLT expenditure.

Over the course of the trial, 13 regular players used the '*Set Play Limit*' feature to exclude themselves for the remainder of the day, 17 used the '*48 Hour Stop*' option to enforce a two-day interruption in play and there were two individuals who opted to self-exclude for a month. Consistent with other research in Nova Scotia the proportion of players seeking assistance in reducing or abstaining from gambling comprised a small yet unique player group. Given the level of activity for these '*contro*l' RG features, it appears that a reasonable number of players were accessing the service but may be testing the shorter term commitment options as they motivate themselves to commit to longer exclusions (e.g. *trying out short-term limits before committing to longer term restrictions.*) This area should be explored further within the key target segment and/or past users (e.g. *those who are seeking assistance in stopping or those who used the system during the trial*) as there is unlikely to be a wide enough demand and relevancy for this option to produce a measurable impact at a total player level. However, lack of broad application does not negate the strong value of the feature for the minority of players who activated it during play.

For the remainder of the Players in the Windsor area, the majority of exposure to RG features was centered on management of money while gambling including setting money limits, tracking money spent, and monitoring cash-in and cash-out.

3.1.2 Adoption of RG Features among Regular Players

There were three main segments relevant for evaluating RG Adoption among the Regular Player base;

- ***RG Adopters*** -those who tried the games at some point and continued to use the features at least 3 + times
- ***Trial Players*** - those who have used the features once or twice

- ***No-RG Players*** - those who did not try the any features over the course of the trial

Table 5: Summary Profile of VLT Players Categories (Total RG Adopters, Total RG Trial Players, Total No-RG Players and Casual Players)

Summary Segment	Number of Day-Site Sessions	Number of Players	% of Money Spent (Revenue)	% Total Day-Site Sessions	% Total of Players	% Regular Players
Regular RG Adopter *(6+ 3+ RG Sessions Over Trial)*	18,239	414	61.1%	60.8%	22.4%	47.5%
RG Trial Regular Player *(1-2 RG Sessions Over Trial)*	5,195	210	17.0%	17.3%	11.4%	24.1%
No-RG Regular Player *(No-RG Sessions Over Trial)*	4,573	247	15.4%	15.2%	13.3%	28.4%
Casual Player (<6 Play Sessions Over Trial)	1,990	983	6.4%	6.6%	53.0%	_____
Total	29,997	1854	100%	100%	100%	100%

NO-RG REGULAR PLAYERS

For many Players, simply having to '*try*' the features (e.g. *acting on a voluntary basis*) appeared to be a barrier to use. ***No-RG Players*** comprised about 28% of the regular players exposed to features but these adults did not even explore the options offered by the system on a trial basis. It may be that the No-RG Players were intimidated by the technology, reluctant to waste resources in learning how the system worked, were skeptical and/or suspicious of the benefits of the features or they may have felt that they did not need any assistance in managing their play. These issues should be explored with the No-RG Players in greater depth in order to understand the context of their observed behavior and to identify opportunities for addressing barriers.

RG TRIAL REGUALR PLAYERS

Trial Players may have been motivated by curiosity but might not have received enough value from the system to continue using it. *Trial RG Players* made up approximately one quarter of

regular players in the Windsor Trial. This group was responsible for 17% of all the play sessions and about 17% of revenue. In some cases, these Trial Players may be "*Droppers*" (e.g. abandoned use due to lack of motivation, lack of interest, lack of relevance, '*do not need the feature*') or in other cases, they may be better characterized as '*Rejectors*' (they rejected the system after trial due to a bad experience, lack of satisfaction, or lack of understanding). Again, it is important to evaluate the response of the Trial RG Players towards the features in order to identify opportunities and threats impacting adoption.

RG ADOPTERS

For the ***RG Adopters*** (e.g. *those who took up on-going use of the features)* there was an initial period when players learned the benefits of the system through trial and error. Following trial, these players continued to use the RG features either because the features provided them with enough value to support continued use or because use had become habitual.

In the current trial, about one in every five Players who played any machine in the test area during the field test (22%) adopted use of the RG features with almost half of all Regular Players (48%) characterized as Adopters. RG Adopters accounted for 61% of all the play sessions that occurred over the trial and 61% of the revenue (e.g. *money spent*) positioning this group as an important segment to target for responsible gambling support.

3.1.3 Continued Use of the Features (Continued Adoption)

Overall, Regular Players who tried any of the RG features during the trial represented approximately one-third of all persons who played any of the VLT machines during the field test.[9] This level of use may seem low from a total player base perspective but it should be kept in mind that the features are not likely relevant for all players. For example, those who play on a casual, infrequent basis may not require play management tools. Moreover, it would be expected that those who played more frequently would be most motivated to try and learn how to use the system. It will be recalled that within the regular player base, the adoption rate was

[9] There was also trial of the RG features by the Casual Players although by definition these individuals had not played six or more times during the test period and in most cases did not meet the criteria used for defining RG use as set in the current study (See Section 2.0 Methodology for a full discussion of the issue and rationale).

far higher, with 71% of Regular Players either trying (24%) or adopting (48%) the system. Regular Players who tried the RG features at least once also accounted for the vast majority of the revenue (78%) and, therefore, were key targets for 'responsible gambling' assistance and support on the part of NSGC.

With close to half of Regular Players adopting the system, it has potential to provide value to a significant proportion of Players. In contrast, those who tried and rejected the system may have done so due to lack of perceived value, or lack of motivation to learn the benefits of the system and take advantage of the various features available on the system.

Another method of assessing relative customer value is to assess the '*Continued Adoption Rate'*; that is the percent of all those who tried the features that take up regular use. When all regular players who took part in the trial were considered, 65% of everyone who tried any of the features continued to use them in subsequent sessions (***Continued Adoption Rate***). This is a relatively high conversion rate of trial to regular use suggesting that there may be value in supporting greater experience with the features, especially if use of the features is associated with positive player outcomes.

FREQUENCY OF USE OF THE RG FEATURES

RG Adopters and Trial Players were assigned to each group based on their frequency of using the system; RG Adopters used the features at least three times whereas Trial Players only used the features once or twice. Given this segmentation, one would expect to find a difference in frequency of use between the two groups. However, it is of value to contrast the two groups to assess the relative level of use of the features after trial during the six sessions of play that occurred following trial (including the trial session). Readers are reminded that for analysis purposes RG use was defined as any sessions where there were 3+ activations of an RG feature in order to control for any accidental activations (For discussion, see Section 2.2.7: Defining an RG Session).

Table 6: Percent Using Each Feature During 6 Post Trial Periods (RG Adopters versus Trial Players)

	RG Adopters (n=414)	Trial Players (n=210)
Live Action	43.23%	18.82%***
My Account	51.17%	26.98%***
My Account Day	32.73%	12.84%***
My Account Week	22.56%	8.89%***
My Account Month	19.75%	9.63%***
My Account Year	20.08%	12.62%**

* significant difference at p≤ .10, ** p≤.05 level ; *** p≤.01 level

Frequency of using each RG feature was examined for both RG Adopters and Trial Players on a per session basis for the first six sessions following trial in order to assess the level of use after trial. Not only were Adopters significantly more likely to have tried and continued to use any RG feature, they also exhibited a consistently high degree of use for most of the features after trial. In the sessions immediately following trial of the features, half of Adopters were checking '*My Account'*, 43% were activating '*Live Account'* at least once during a play session and about one in five were checking, weekly, monthly or yearly account summaries. Thus, it appears once these more frequent players were exposed to the features they were at least twice as likely as the Trial Users to keep on accessing the information screens over the course of normal play.

3.1.4 Comparison of RG Adopters to No-RG Players on Key Session Outcomes

To gain insight as to '*what*' if any impact this RG use might have for game behaviors and outcomes, a comparison was made between those Players exposed to the RG features on a regular basis following trial (Total RG Adopters; n=414) versus those who had no exposure to the features (No-RG Players; n=247).

Table 7: Profile of Session Outcomes for RG Adopters versus No-RG Players (Post Trial)

	Post-Trial Measures	
Description of Game Outcomes	**No-RG Player (n=247)**	**Total RG Adopters (n=414)**
Average Session Length *(Minutes)* *(e.g. The amount of time the card was inserted into the machine, on average, each session)*	77.0 minutes	89.3 minutes***
Average Number of Days Between Sessions *(e.g. Frequency of play in terms of average number of days between each play session)*	9.6 days	5.2 days***
Total Money Put in Per Session *(e.g. Total amount of money put into the machine, on average, each session; Cash in)*	$173.81	$248.28***
Total Money Cashed-out Per Session *(e.g. Total amount of money cashed out of the machine, on average, each session; Cash-out)*	$121.13	$202.80***
Total Money Played Per Session *(e.g. Average amount wagered each session including winnings used for additional play)*	$725.31	$821.07*
Total Money Won Per Session *(e.g. Total average winnings that occurred during each play session)*	$672.61	$775.59*
Total Money Spent Per Session *(e.g. Average amount spent by the player, out-of-pocket, not including reinvestment of winnings)*	$52.69	$45.48
Number of Different Machines Played Daily	1.6	1.9***
Dollars Bet per Play Hour *(e.g. Average amount of money wagered per hour of play on the machines each session)*	$528.45	$534.58
Games Played (Spins) per Hour of Gambling *(e.g. Average number of 'hit/pulls' per hour of play)*	639.5	663.2
Percent Cash-Out *(e.g. Average percent cashed out of the machines as a percent of the total amount of money put into the machine; Money In/Money Out)*	69.0%	75.9%**

significant difference at p≤ .10, ** p≤.05 level ; *** p≤.01 level

Game behaviors and outcomes were summed for each player over the first six play sessions that occurred following trial for those in the RG Adopters Segment (Post Trial). A similar set of six play sessions were summarized for the No-RG Players for comparative purposes. Average session characteristics were then calculated for each player and then averaged within each group.

There were a number of highly significant differences in session characteristics between the Players who were using the RG features and those who had never accessed the features.

In comparison to those who did not use the features, RG Adopters had ***longer play sessions*** (89 minutes versus 77), ***higher frequency of play*** (only 5.2 days between play sessions versus 9.6), and ***put more money in the machine per session*** ($250 versus $170), all behaviors consistent with heavier playing patterns.

However, in terms of game outcomes related to expenditure, the RG Adopters exhibited ***higher winnings*** ($775 versus $670), ***higher amount of money cashed out during play*** ($200 versus $120) and ***a higher percent of cash-out*** (76% versus 69%).

The results of this analysis suggested that in the short-term after trial, the RG Adopters appeared to derive greater play value than the Non-Adopters; winning more, playing for longer time period for the same money, experiencing higher cash-out and yet there was no significant difference in amount spent.

The next step was to assess the longer-term impacts of RG use and related outcomes.

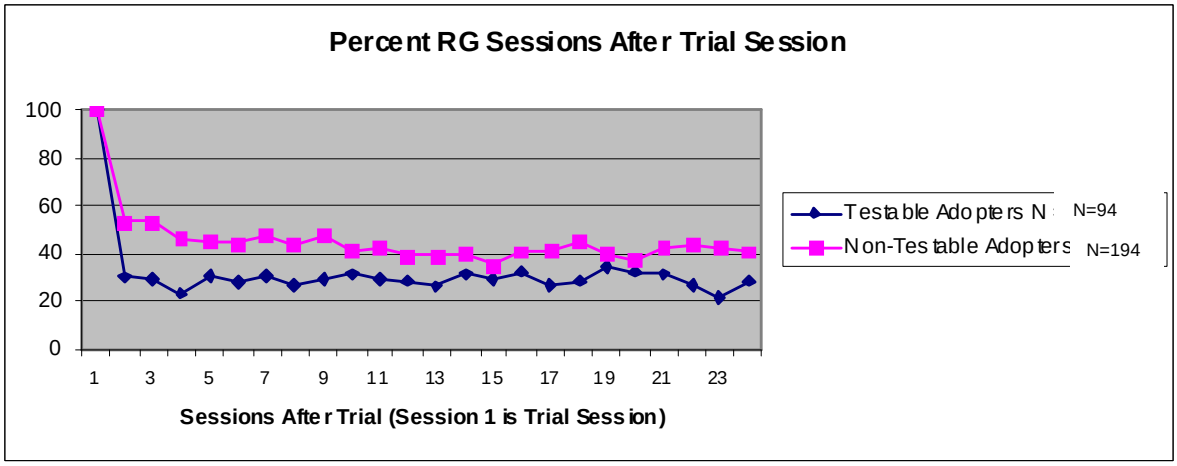
3.2 Persistence of Adoption

A key criterion for deployment of the system is related to the length of adoption or persistence of the behavior; if those who adopted the use of the system continued to use the features for an extended period after initial adoption, this would illustrate the long-term relevance of the system once the novelty factor wore off.

In order to examine long-term impacts after trial, a new segment of adopters was created based on those who had 18 or more post trial sessions (Testable Adopters: n=94; Non-Testable Adopter: n=194; Total sample n=288). Specifically, a set of 24 post-trial sessions were examined for qualified RG Adopters to determine, over time, the percent of sessions in which RG features were accessed. The eighteen or more post-trial session criterion was required so that the behaviors measured at the early and later sessions were based on the same people

thereby ensuring that any observed differences were not due to changes in the sample composition.

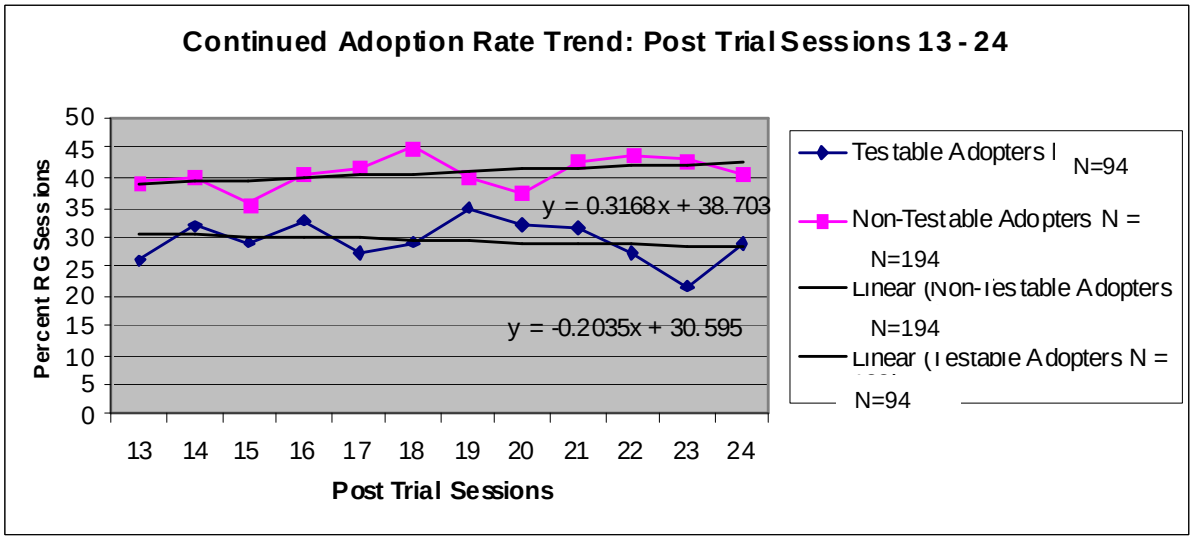
Figure 1: Percent of RG Sessions (e.g. sessions when RG features were activated 3+ times) for Adopters after Trial



As can be seen in Figure 1, qualified Non-Testable Adopters started with an RG usage rate above 50%, meaning that 50%+ of these Adopters were activating at least one RG in post-trial sessions two and three. This rate eventually declined to around 40% by session ten. For the Testable Adopter segment, a similar pattern emerged; triggering of RG features consistently occurred in about 20% to 40% of play sessions following trial.

It will be recalled that Non-Testable Adopters were comprised of those VLT Players who immediately took up use of the RG features, therefore, it was not possible to generate three sessions of play to use a pre-measure benchmark prior to trial. The findings above suggest that this group may have been the most enthusiastic '*adopters*' of the system as evidenced by the higher rates of on-going use in the sessions following trial. Thus, Testable Adopters, for whom pre-post measures could be generated, appeared to be more conservative in their use as compared to the Non-Testable Adopters (e.g. *those who took up use of the RG features within three day-sessions of play*).

Figure 2: Continued Adoption Rate Trend for RG Adopters (Post Trial Sessions 13-24)



To examine the long-term effects in greater detail, behaviour was plotted exclusively focusing on use of the features in the 13 to 24 sessions after initial trial. Figure 2 shows the trend lines for sessions thirteen to twenty-four post-trial; a point when most behaviors that might be attributed to learning the system, could reasonably be expected to have diminished or been extinguished. A linear trend line was fitted to each set of data to estimate whether the trend at this point was relatively flat, which would suggest that RG usage was likely to be stable and persist over time, or was declining which would suggest that usage drops off following the novelty of trial.

In both cases the slope of the line, as noted in the respective equations, was essentially zero indicating that use of the RG features was very stable over the trial and persisted well beyond the initial trial session (.32 for Non-Testable Adopters and -.20 for Testable Adopters indicating a drop in usage of between 0.2% and 0.32% percent after each session; coefficients that do not differ significantly from 0).

The next step was to examine the characteristics associated with of RG sessions compared to Non-RG sessions.

3.2.1 Comparison between RG Sessions versus Regular Sessions by Adopters (For Those Who Played 18+ Sessions)

Table 8: Profile of RG Sessions versus Non-RG Regular Play Sessions by Adopters (18+ Post Trial Sessions)

	Regular Sessions	RG Sessions	RG Session Increase	RG Session % Increase
Total Money Put in Per Session *(e.g. Total amount of money put into the machine, on average, each session; Cash-in)*	$143.76	$373.12***	$229.36	159.5%
Total Money Cashed-out Per Session *(e.g. Total amount of money cashed out of the machine, on average, each session; Cash-out)*	$105.25	$316.41***	$211.16	200.6%
Total Money Played Per Session *(e.g. Average amount wagered each session including winnings used for additional play)*	$502.12	$1,164.85***	$662.73	132.0%
Total Money Won Per Session *(e.g. Average, total winnings that occurred during the play session)*	$463.61	$1,108.14***	$644.53	139.0%
Total Money Spent Per Session *(e.g. Average amount spent by the player, out-of-pocket, each session not including reinvestment of winnings)*	$38.51	$56.71***	$18.20	47.3%
Games Played (Spins) per Session of Gambling *(e.g. Average number of 'hit/pulls' per hour of play, each session)*	749	1,342***	593	79.1%
Average Session Length *(Minutes)* *(e.g. The amount of time the card was inserted into the machine, on average, each session)*	67.5	122.6***	55.1	81.6%
Amount of Time Spent at the Venue *(Minutes)* *(e.g. Average minutes from the time the card is first inserted in any machine at start of day-site session until last time the card was used (i.e. removed) at that site)*	97.1	184.3***	87.2	89.7%
Percent Cash-Out *(e.g. Average percent cashed out of the machines as a percent of the total amount of money put into the machine; Money In/Money Out)*	61.3%	81.8%***	20.5%	33.5%
Percent Winning Sessions *(e.g. Percent of sessions, on average that ended in a positive cash outcome)*	19.9%	28.0%***	8.0%	40.2%

significant difference at p≤ .10, ** p≤.05 level ; *** p≤.01 level

Table 7 presents the **averages** over the twenty-four post-trial sessions for RG and regular, non-RG sessions among all qualified Adopters (n=288; Testable Adopters: n=94; Non-Testable Adopters: n=194).

Characteristics for the RG sessions differed significantly (p<.000 two tailed) from the profile for regular (non-RG) sessions of play (i.e. *sessions in which there was no use of the RG features*). The sessions were selected only for those players who had 18+ sessions so that the figures were derived from a consistent sample over time with sufficient observations (i.e. *sessions of play*) to allow for comparison of RG versus non-RG play sessions without introducing any potential bias associated with differences in frequency of play.

It can be seen that within this player group, in declining order of percentage increase, the sessions in which the RG features were activated were characterized by higher **money out, money in, money won, money played, longer times at the venue, longer time gambling at the venue, increases in actual time on the machines gambling, increase in games played and finally, an increase in money spent.** However, two other increases, although lower in terms of absolute differences were, perhaps, most significant in practical terms; **Cash-out as a percent of cash-in increased by 33.5% and the percent of winning sessions increased by 40.2%.**

On average, players who had more than 18 sessions of play during the test period tended to spend more money in those sessions when they used the RG features than in those sessions when they did not use the features ($56.71 versus $38.51). However compared to the other related sessions characteristic the difference in expenditure was not as high as expected. For example compared to non-RG sessions other related session characteristics were 80% to 200% higher during the RG sessions (e.g. *total money played/wagered was 132% higher in the RG sessions, time spent gambling increased by 80% and the amount of money won went up by 140%*), yet the amount spent out-of-pocket by the players only increased by about 47%. This meant that players were spending less than expected given their heightened level of engagement. It may even be that they were spending less overall than was the case

prior to their adoption of the RG features or, at minimum maintaining spending levels. Unfortunately, play behaviors and game outcomes prior to the introduction of the features were not benchmarked and, therefore, cannot be used definitively to compare impact, although the evidence suggests that expenditure was lower than expected for RG session outcomes.

Based on the available information, cash-out and winning percentages were up which strongly suggested the use of RG features (e.g. *cash-in/cash-out*) to inform stopping strategies (e.g. *stopping gambling, at a time when they are still winning, at a time they can take some cash away from the machine, or at a time when they have reached their spending limit thereby interrupting or reducing chasing of losses*). **This would mean that the RG features have provided players with a means and/or the motivation to better control their own behavior such that they obtained more entertainment value out of the gambling machines while simultaneously controlling or '*capping*' the amount spent.**

This finding is particularly important because a system, such as the RG System, at best, is most likely to help Players exert control over their behaviors so that they can achieve their own desired goals. **Discovering reduced expenditure due to the use of the system is beneficial, but finding evidence that Players are effectively using the system to control their behavior (e.g. *amount spent*) to achieve their desired outcomes (e.g. *reduction versus control*) is preferable as an indication of the system's value and impact. Therefore, in order to achieve a reduction in expenditure means that the player must be motivated to spend less on gambling and then this system should be effective in helping them achieve this end-goal. Conversely, the ability to monitor money spent may provide sufficient information to motivate players to stay on budget or to reduce expenditure.** This should be examined further.

3.2.2 Persistence of RG Session Characteristics

In order to identify any long-term or persistent changes in session characteristics, association with various game outcomes was examined and compared over time for RG versus Non-RG (e.g. regular) sessions of play,.

While the amount of absolute money spent was consistently higher during the RG sessions, the evidence suggests that by 13+ sessions following trial, there is a declining trend emerging for expenditure (see Figure 3 below). This trend is not evident for the regular, Non-RG sessions **suggesting that over time the Adopters may be learning how to use the system to exert control in amount spent.** Additional tracking information would be required to confirm this decline in expenditure. However, it can be stated with greater certainty that on-going use of the RG features was not associated with increased amounts spent, an equally important observation in terms of assessing positive and negative influence.

Figure 3: Amount Spent Per Session by Adopters for RG Sessions versus Non-RG Session (18+ Post Trial Sessions)

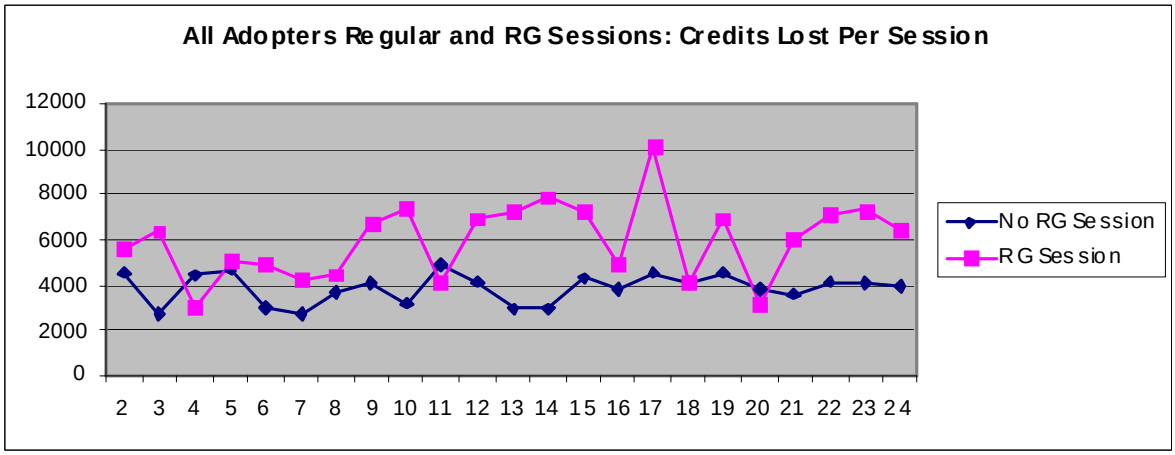
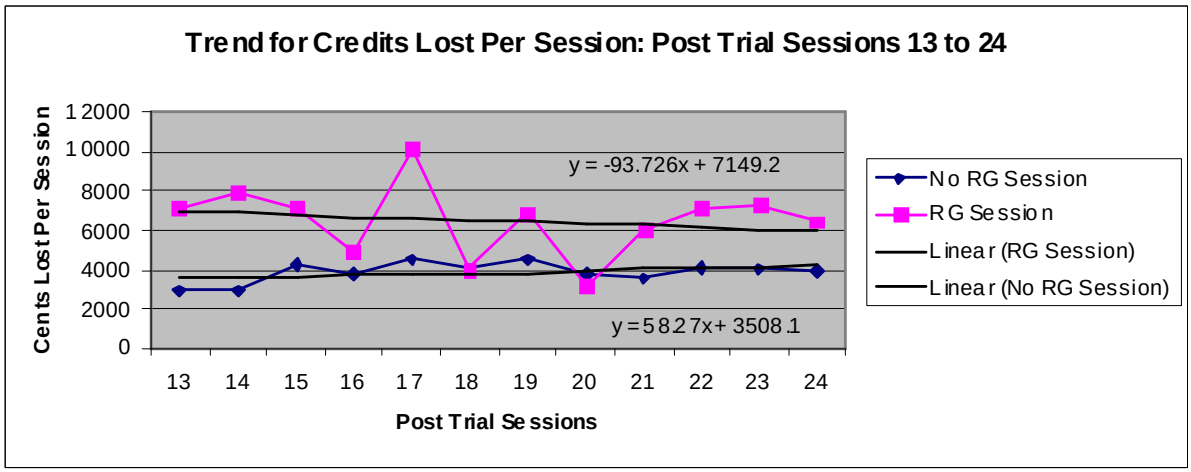


Figure 4: Trends for per Amount Spent per Session Post Trial Sessions 13-24



In Figure 3 expenditure seemed to be relatively flat over time whether an RG feature was used or not. In Figure 4, a trend line was added to the outcomes for amount spent per session that occurred for play between 13 and 24 sessions after trial. There appears to be a downward shift starting to occur such that amount spent in RG sessions were starting to decline and this did not occur among the non-RG sessions. Additional longitudinal measurement would be required to confirm this trend.

Figure 5: Money Played Per Session for Adopters (Regular versus RG Sessions)

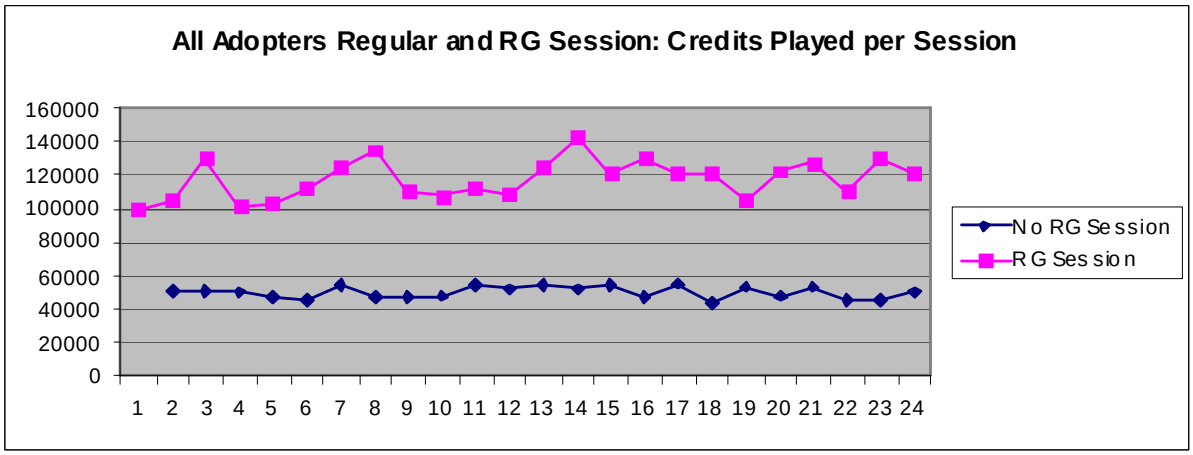
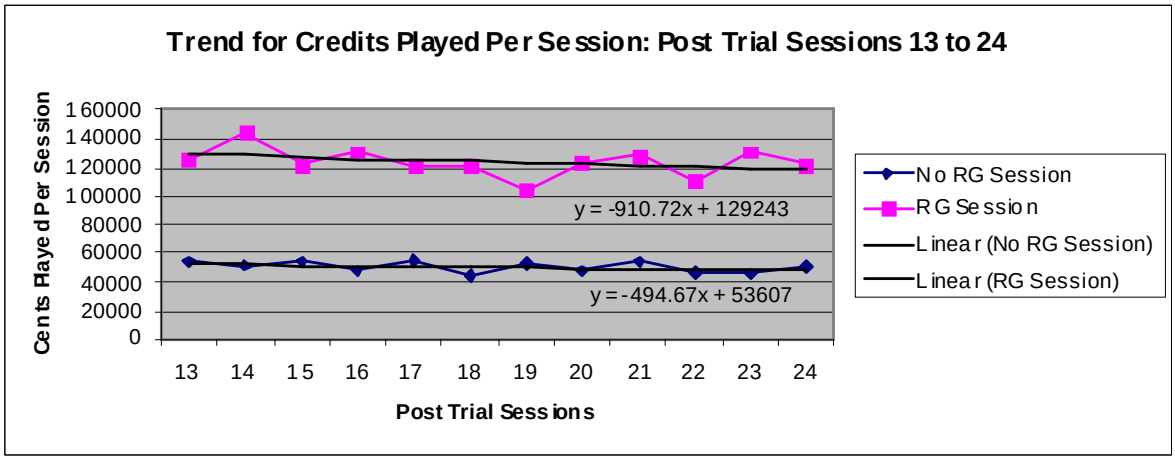


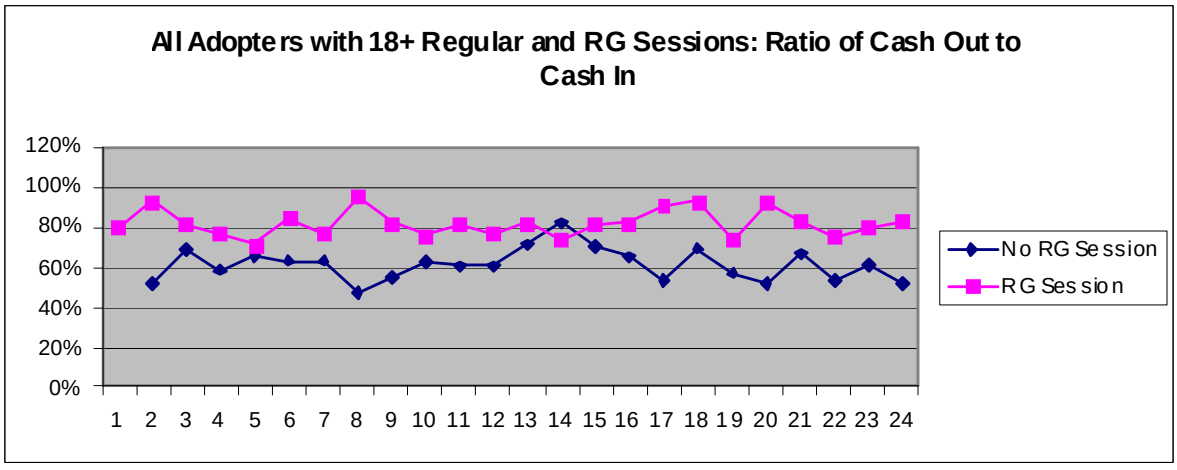
Figure 5 illustrates the trend for '*amount played*' per session. Compared to the previous graphs, there is a much larger gap in the amount wagered during play between the RG sessions and the Non-RG sessions; Adopters consistently played with substantially more money during those sessions involving the use of RGs, although the difference in absolute amounts spent was considerably smaller and did not reflect the magnitude of the wagering activity.

Figure 6: Trend for Money Played Per Sessions (Post Trial Sessions 13-24)



When the relationship was examined specifically for 13+ post trial sessions **a similar declining trend appeared to be emerging that was not evident for the non-RG sessions again suggesting that as players gained more experience with the RG features they were able to start using them more effectively to manage expenditure.**

Figure 7: Ratio of Cash-Out to Cash-In For Adopters (18+ RG versus Non-RG Regular Sessions)



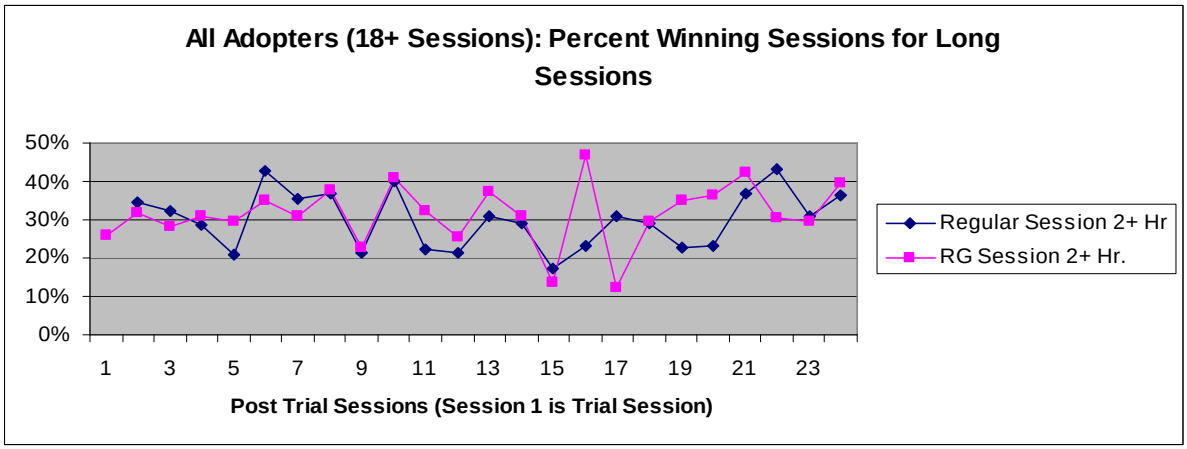
Despite the tendency for Adopters to have spent more money during the RG sessions there was also a higher rate of winnings which consistently resulted in a better cash-out ratio for the RG sessions. The percent of cash returned to the players was consistently higher over the course of the 24 sessions evaluated with the percent returned falling around the 80% or higher mark.

Comparatively, the ratio of cash-out to cash-in for non-RG sessions ranged from about 50% to 70% only hitting a high of 80% once.

3.2.3 Relationship between Session Length and RG Benefits

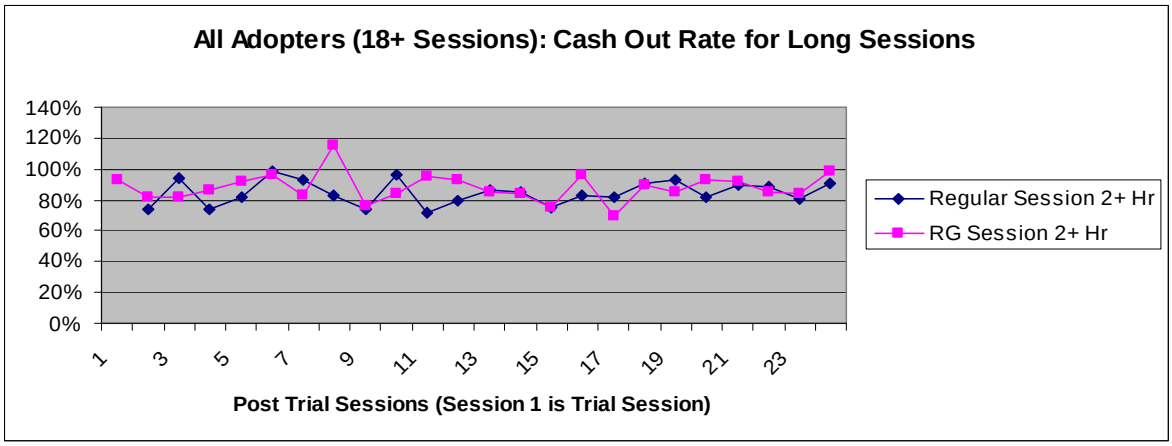
Logically, longer play sessions tended to be associated with winning sessions as the player can continue to play with 'won' money. Regular Players rarely end a session if they have a large win early in that session and usually are more inclined to play with the 'found money', using it to extend play rather than cashing out.[10] In contrast, shorter sessions usually occur because people run out of cash to continue playing. Due to this relationship, shorter sessions are more often associated with losing sessions and, therefore, lower rates of cash-back. Given this relationship it was important to assess the performance of the RG features relative to session length in order determine whether this characteristic was related to the differences in cash-out and winnings associated with RG use.

Figure 8: Percent Winning During Long Sessions by Adopters with 18+ Play Sessions (RG Sessions versus Non-RG Regular Sessions)



[10] Refer to the 1998 Nova Scotia Regular VLT Players Study conducted by Focal Research for the Nova Scotia Department of Health pages 3-56 to 3-64.

Figure 9: Cash-out Rate for Long Sessions by Adopters with 18+ Play Sessions (RG Sessions versus Non-RG Regular Sessions)



The above figures show the percent of winning sessions and the cash-out rates for sessions that were more than two hours in length (e.g. *Long Sessions*). Compared to shorter sessions that lasted under 2 hours, cash-out rates in general were substantially higher and did not differ significantly between RG sessions (85%) or non-RG sessions (88%). (See Figure 9). The same was true for '*percent winning sessions*' with approximately 30%-32% of regular or RG play sessions ending in a '*win*' or positive cash outcome (see Figure 8). The results for the longer, higher-payout sessions indicated that the use of the RG features had limited impact on cash-out for long sessions of play (2 hours+), suggesting that for the longer, higher cash-out sessions (e.g. *when players are more likely to be winning*) the use of the RG features had a less discernable influence on play.

Figure 10: Percent Winning During Short Sessions by Adopters with 18+ Play Sessions (RG Sessions versus Non-RG Regular Sessions)

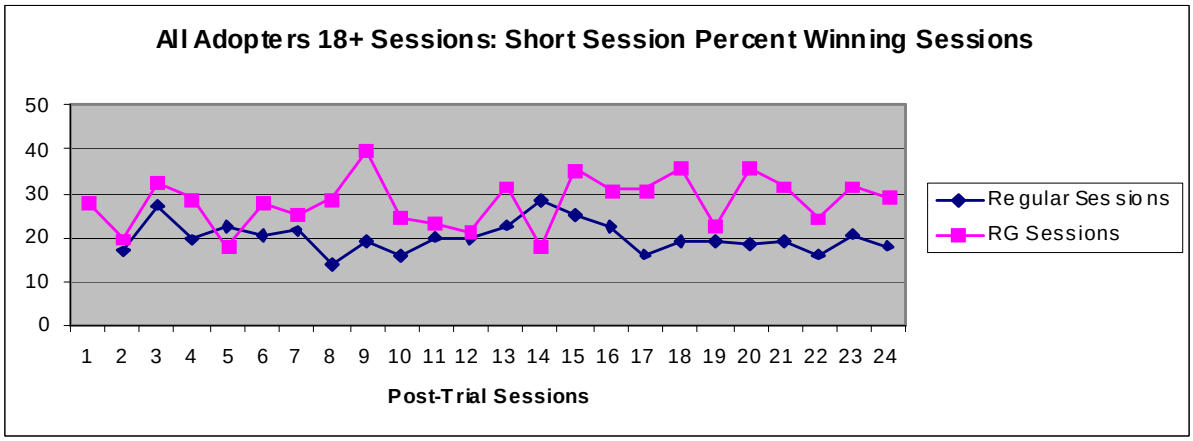
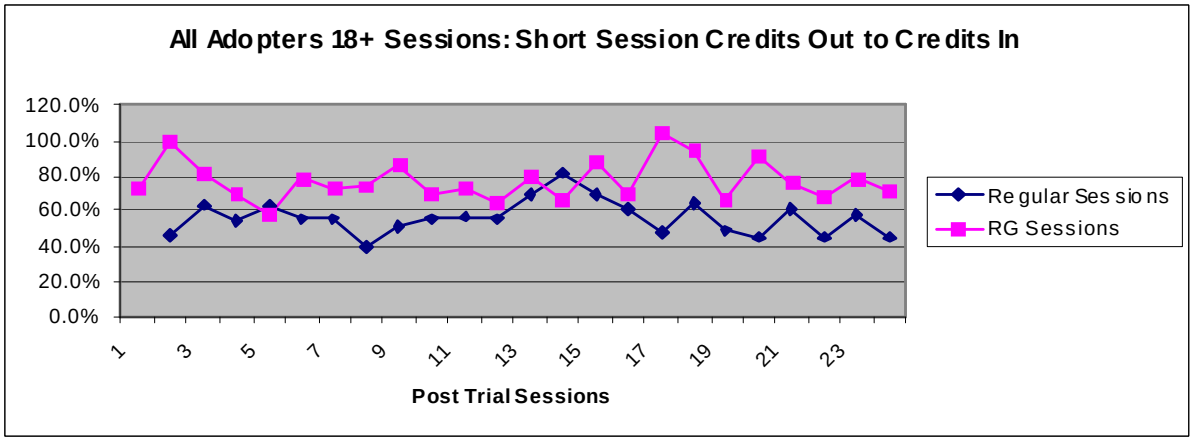


Figure 11: Cash-out Rate for Short Sessions by Adopters with 18+ Play Sessions (RG Sessions versus Non-RG Regular Sessions)



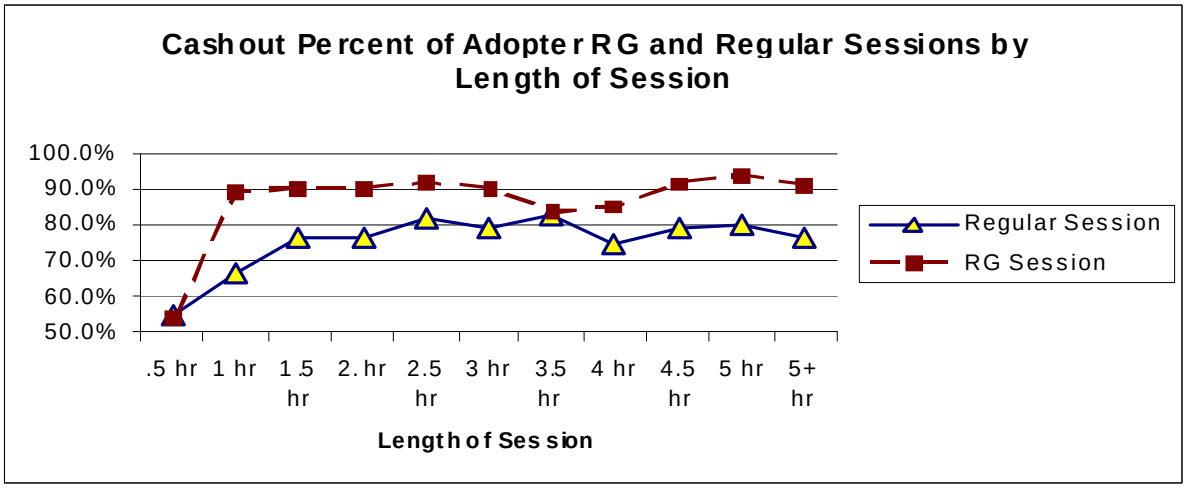
The outcome was markedly different for Short Sessions (< 2 hours) where the use of the RG features appeared to have more impact (Figures 10 and 11). In shorter sessions of play (<2 hours) the RG sessions were associated with higher cash-out rates (≈77% compared to ≈56%) and a higher rate of winning sessions (≈28% compared to ≈20%). **While the average RG session is much longer than those play sessions when Adopters did not use the RG features (122.6 minutes versus 67.5 minutes), the true impact of the system was felt during the shorter sessions. These sessions may be shorter in part because the RG system motivated players to stop before they lost more money.**

3.2.4 Session Length and the Impact of RG Use

To further explore the differential relationship between RG use and session length, cash-out rates were examined and compared for RG versus regular non-RG play sessions (*per session comparison*) and for Adopter versus Non-Adopter player segments (*per player comparison*) by length of the session.

Figures 12 and 13 illustrate the relationship between cash-out percent and session length for all adopters over all their play sessions.

Figure 12: Cash-out Percent by Session Length for all Adopters (RG Sessions versus Non-RG Regular Sessions)

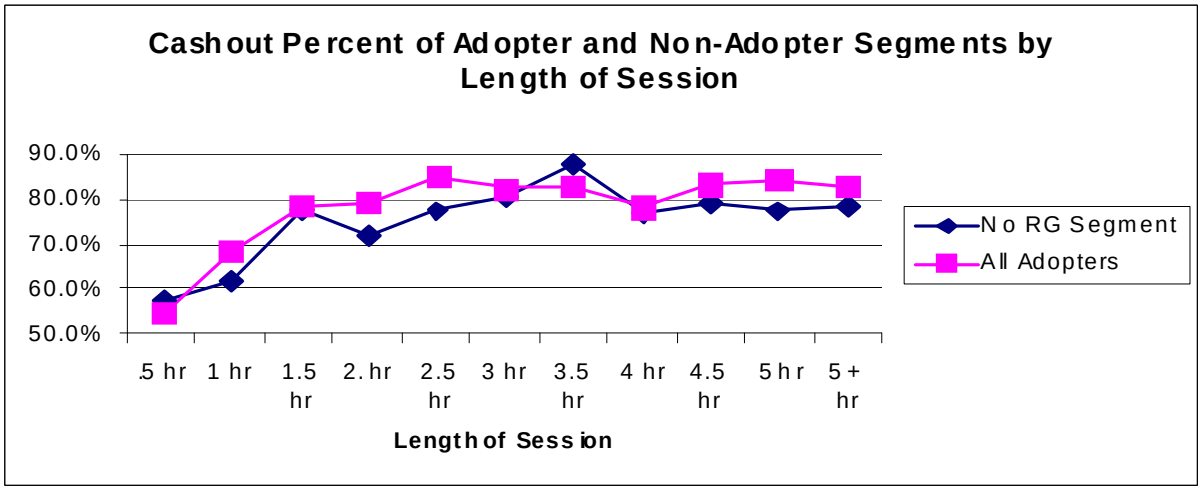


In Figure 12, it can be seen that RG sessions that were approximately 30 minutes or longer in duration achieved the maximum average cash-out rate of about 90%. In contrast, non-RG or regular sessions for these same people never achieved this rate of return. In the regular sessions when RG features were not used, maximum cash-out rates of ≈80% were observed after about two hours of play. The significant gap in cash out rates between the two types of sessions was consistent.

One explanation is that RG Adopters only used the RG System when they were resolved to stick to a stopping strategy and the RG System merely facilitated what they would have done on their own. If this were true then the overall cash-out rate between RG Adopters and Non-

Adopters should then be similar as these individuals should be similarly likely and able to enact a stopping strategy.

Figure 13: Cash- out Percent by Session Length for RG Adopter versus No-RG Use (Non-Adopter) Segments



The second graph (Figure 13) shows the cash-out rate over the length of all sessions for these two independent samples. Although the trend is smoother for Adopters due to larger sample size (n=414) as compared to the No-RG Use segment (n=247) and more session observations (RG Adopters: ≈18,239 versus No-RG Use: ≈4,575), the trend for cash-out rates tended to be consistently higher among the Adopter segment for most session lengths although there were points of convergence observed. Overall, the combined average cash-out rates for all Adopter sessions was significantly higher than the rates for non-Adopters (81% versus 69%, $p < .001$)[11]. **Therefore, use of the RG system appears to have provided some players with assistance in achieving improved cash-out rates.**

[11] Non-Testable Adopters were excluded from the comparison for clarity as it is uncertain if these players were already different on some measures prior to taking up use of the RG features. However, it should be noted that per session cash out rates were also significantly higher among all Adopters as compared to the No-RG Players (69% versus 76% $p<.05$).

3.2.5 Key Benefits to the Player in Adopting the System: Higher Cash-Back Rate and More Winning Sessions.

Based on outcomes for RG Adopters over the twenty-four post-trial sessions, two primary benefits of RG use were identified; increased cash-out percent and increased percent of winning sessions. Both outcomes were significantly higher among those sessions in which players used any RG features. In Figures 14 and 15 below, the trend lines were relatively flat over the range of sessions suggesting the effects were consistent over time and continued to differentiate game outcomes between the two types of session (RG versus No-RG use). **Therefore, the key benefits of the RG system appeared to be related to comparatively better game outcomes for players in terms of managing play value.**

Figure 14: Percent Winning Sessions for Adopters (18+ Regular & RG Sessions)

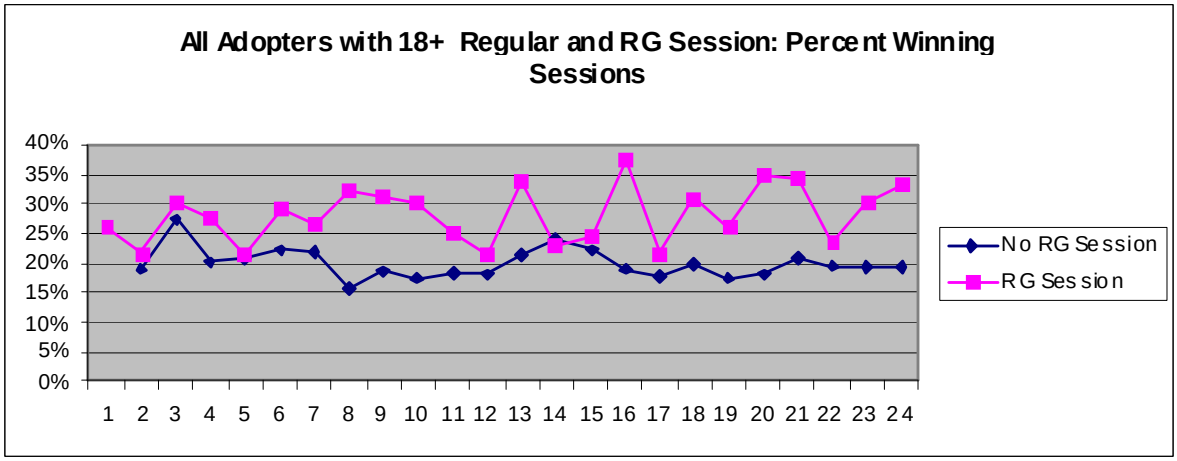
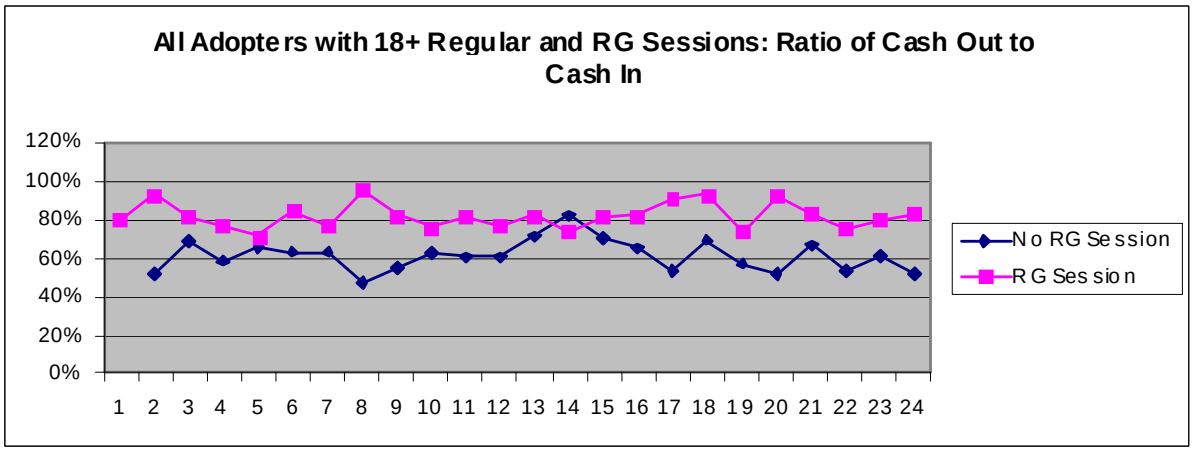


Figure 15: Ratio of Cash Out To Cash in For Adopters (18+ Regular & RG Sessions)



Despite the fact that the RG Players reached maximum cash-out rates earlier, longer sessions (2+ hours) comprised 29.1% of RG Adopter's play sessions compared to 22.7% for the No-RG Segment. Moreover, almost half (45.3%) of Adopter's RG sessions were over two hours in length as compared to only 16.9% of sessions when they did not use the RG features. Yet losses did not accumulate at any greater rate. This would suggest that players were more likely to have used the RG features during longer sessions (*when they were more likely to be experiencing wins, more cash-in, more cash played*) and that RG use was associated with improved and or positive game outcomes including better rates of return (*cash-out rates*) and more winning sessions. The ability for players to be able to use the RG feature to check on their play status may have encouraged them to cash out smaller wins than they might otherwise have done, simply because they were caught up in the games. This effect of RG use was even more pronounced for short sessions under 2 hours in length; a situation when players are more likely to be in a loss position. In this situation, the features may have reinforced the player's resolve to stick to a budget or limit or to cash out early big wins.

What is not clear is if players may start to play longer or more frequently in response to improved game outcomes (e.g. *better rates of cash out and extended play sessions*). It is also unclear what implication these findings may have for higher risk players. The ability to answer the first question is limited by the length of the field trial (e.g. six-months), although findings

among those playing most frequently over the course of the trial (18+ sessions of play) suggested that player response was stable over time. However, in order to isolate the impact of RG use it was necessary to undertake additional impact analysis for all players and ideally based on risk for problem gambling.

3.3 Impact Analysis - General Linear Modeling

Descriptive analysis identified a number of effects associated with RG use that provided direction for designing analysis to isolate and substantiate causal association between use and outcomes.

The following section undertakes to address the impact of adoption of the RG System on per session expenditure levels by Players after (and including) the initial trial session of the system. For purposes of the analysis, pre versus post-trial change in behaviour, was contrasted between **RG Adopters** (**Experimental Group**) comprised of those who adopted use of the RG System by using it on three or more occasions (e.g. *3+ RG activations in 3+ day-sessions of play*), and **No-RG Players** (**Control Group**), comprised of those who never had an RG session (*<3 RG activations in any day-session*) over the period of the test period. (See ***Section 2.3 Sample Design*** for a more detailed description and discussion of these player segments.). Collectively the two segments included in the analysis comprised 75.9% of all Regular Players in the trial and contributed 76.5% of the revenue (e.g. *money spent out-of-pocket*).

Those who tried the system (***Trial RG Players***: *1 – 2 RG Sessions over the period of the Windsor Trial*) and those who had fewer than six play sessions, in total, over the course of the trial (***Casual Players***) were excluded from the analysis as it was not possible to generate appropriate pre-post measures for testing purposes. Measuring the impact of the RG System on these two excluded segments is warranted but falls beyond the scope of the present study.

3.3.1 Suitability of Pre-Trial Measures and Group Composition

Three major aspects of the pre-trial sessions of the two segments were compared. (See ***Section 2.2: Research Design and Rationale*** for detail surrounding analysis assumptions):

i. Both pre and post-trial session profiles were compared to assess the similarity of session characteristics and to highlight post-trial differences that may warrant further investigation.

ii. Trend analysis of the pre-trial sessions was conducted to ensure the benchmark sessions selected for Adopters were not distinctive. It was possible that these sessions were unusual which contributed to the delay in the player adopting the RG System (e.g. *comprised of short sessions that were not conducive to or relevant for trial of the RG System*).

iii. Assessment of timeframes for trial to ensure pre-measures was similar for the Control and Experimental player segments. If a large percentage of the pre-trial sessions for the RG Adopter segment occurred several weeks later than those of the No-RG Player segment then the comparability could be questioned.

PRE AND POST-TRIAL PROFILE OF TESTABLE ADOPTERS AND NO-RG SEGMENTS

Table 7 below highlights the differences and similarities between the two segments compared in the GLM analysis: **Testable Adopters** (n=122) versus **Testable Non-Adopters** (n=247).

It was desirable, but not essential, that the pre-trial sessions used as a base for the repeated measures GLM were as similar as possible. The first seven characteristics examined were those of the actual day-sessions. As this is the primary unit of analysis, segment similarity was a more important consideration.

There were no significant differences at the $p < .10$ level for any of the measures lending support to the contention that these sessions were analogous. Frequency of play, represented by the days between sessions, did differ significantly between the groups ($p < .05$). However, since the comparison is being made on a per session basis, differences in frequency do not influence the comparability of the segments. For the pre-trial measures, the two segments exhibited the same rate of activity (e.g. *games played and money bet per hour*) over all sessions

at the venue prior to trial (*Characteristics 9 – 11*). Also, importantly, Characteristic 11: Percent Cash-back, started out virtually identical at 74% - 76% for the two segments prior to trial.

Table 9: Profile of Testable RG Users & Non-Users (Pre-Post Trial)

	Pre-Trial Measures		Post-Trial Measures	
	No-RG Use Control Group (n=247)	Testable Adopters (n=122)	No-RG Use Control Group (n=247)	Testable Adopters (n=122)
1. Average Session Length *(Minutes) (e.g. The amount of time the card was inserted into the machine, on average, each session)*	78.8	81.6	77.0	97.9**
2. Total Money In Per Session *(e.g. Total amount of money put into the machine, on average, each session; **'Cash-in'**)*	$164.71	$204.57	$173.81	253.19
3. Total Money Cashed Out Per Session *(e.g. Total amount of money cashed out of the machine, on average, each session; **'Cash-out'**)*	$124.41	$157.57	$121.13	213.37
4. Total Money Played Per Session *(e.g. Average amount wagered including winnings used for additional play)*	$698.32	$680.33	$725.31	821.14
5. Total Money Won Per Session *(e.g. Total winnings that occurred during the play session)*	$658.03	$633.33	$672.61	781.32*
6. Total Money Lost Per Session *(e.g. Average amount spent by the player, out-of-pocket, not including reinvestment of winnings)*	$40.30	$47.00	$52.69	$39.8.2**
7. Number of Different Machines Played Daily	1.6	1.8	1.6	1.9
8. Days Between Sessions	9.2	3.2**	9.6	3.2**
9. Dollars Bet per Play Hour *(e.g. Average amount of money wagered per hour of play on the machines)*	$493.29	$477.68	$528.45	$493.83

Table 9 Continued: Profile of Testable RG Users & Non-Users (Pre-Post Trial)	Pre-Trial Measures		Post-Trial Measures	
	No-RG Use Control Group (n=247)	Testable Adopters (n=122)	No-RG Use Control Group (n=247)	Testable Adopters (n=122)
10. Dollars Bet per Total Hour *(e.g. Average amount of money wagered per hour from the time of player activation of the machine until the card is withdrawn from the system)*	$490.80	$475.78	**$527.76**	$492.18
11. Games Played (Spins) per Hour of Gambling *(e.g. Average number of 'spins/pulls' per hour of play)*	643.8	637.7	639.5	638.14
12. Percent Cash-Out *(e.g. Average percent cashed out of the machines as a percent of the total amount of money put into the machine;* ***'Money In/Money Out'*** *)*	**76%**	74%	69%	81%**

significant difference at *p≤.10 level; ** p≤.05 level ***p≤.01level

Following trial of the RG features, significant differences emerged between the two player groups for four of the post-trial measures.

Compared to the No-RG Use Control Group the Testable Adopters had ***longer sessions*** ($p < .05$), ***higher winnings per session*** ($p < .10$) and had ***reduced expenditure per session*** ($p < .05$). One consequence of these changed characteristics was that the player's ***average percent cash-out was higher*** for the Testable Adopters ($p < .05$). This increase in percentage cash-out meant that Adopters had a per session expenditure rate that was 40% lower when compared to the No-RG Players. Some of this change is manifested as increased session length for the same amount of expenditure.

It is worth noting that there was ***no significant increase in frequency of play*** for the Adopters suggesting that, in the short-term, improvements in game outcomes had not been associated with an increase in how often they played.

TREND ANALYSIS OF PRE-TRIAL SESSIONS

Trend analysis of two key session characteristics was conducted in order to:

- examine the pre-trial play patterns;
- assess the suitability of the measures as a base; and,
- identify any patterns that might impact on the suitability of the post data for inclusion in calculating the session variables.

In particular, there was concern that the sessions selected to represent the pre-session measure for the No-RG Players might not have been appropriate for comparison purposes (e.g. *the sessions may have been shorter, less engaging, non-representative*) and such factors may have played a role in influencing lack of trial of the features.

Two measures of activity, ***dollars played*** (e.g. *amount of money bet per play*) and ***number of games played*** (e.g. *number of 'spins/pulls' or plays per session*), were felt to be reasonable proxies for assessing session '*size*' and the '*degree*' of player involvement in the session (see Figures 16 & 17 below).

Figure 16: Trends in Dollars Played Per Session by RG Adoption Segments

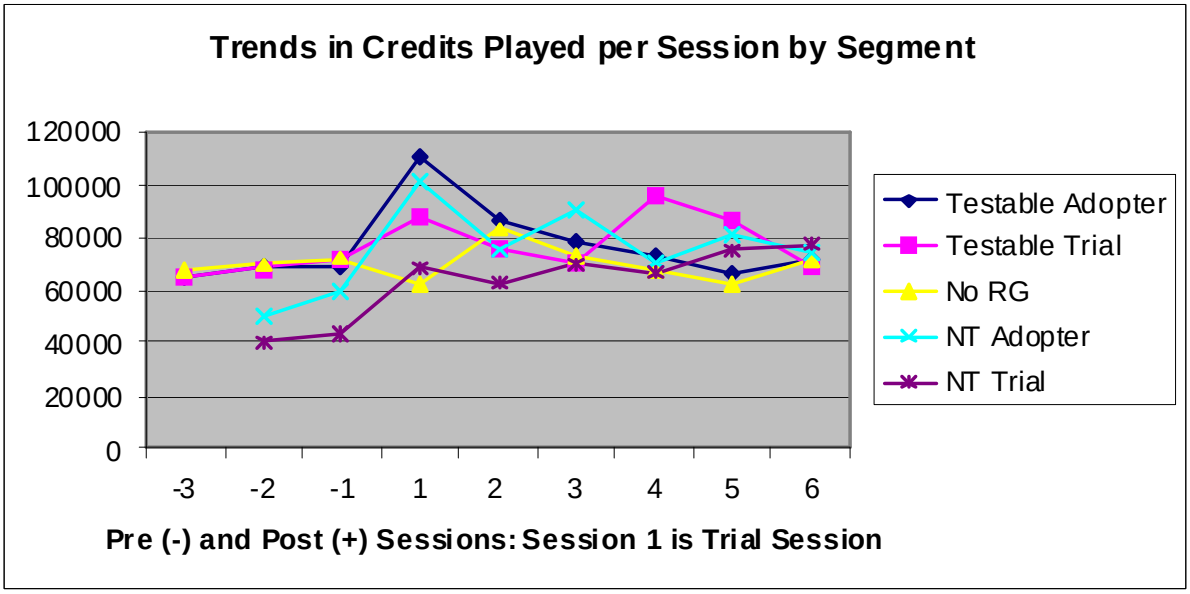
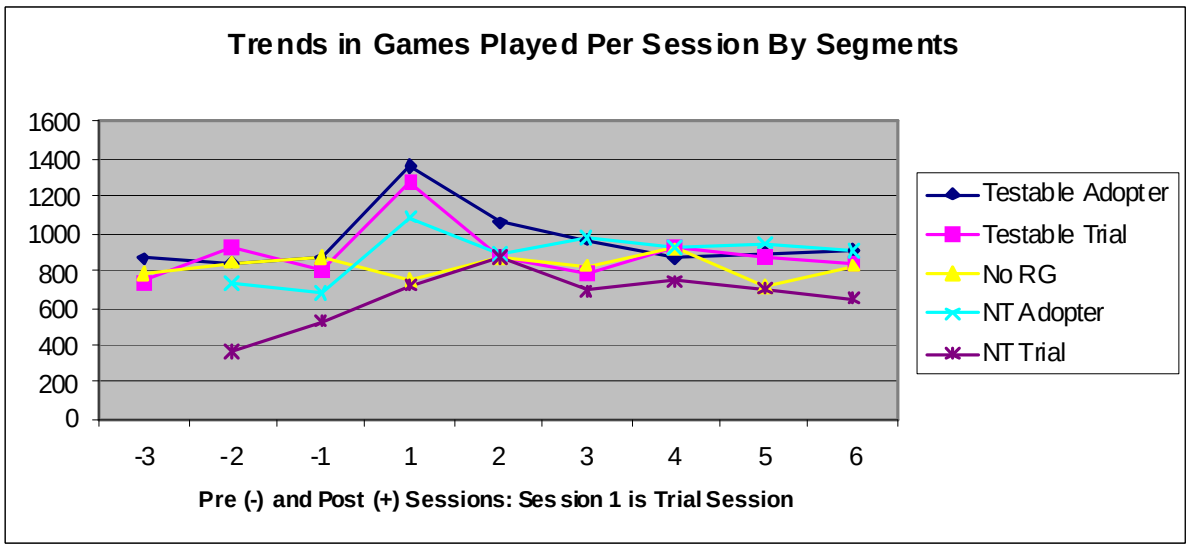


Figure 17: Trends in Games Played Per Session by RG Adoption Segments



Two key findings emerged from this analysis:

- First, profiles of pre-trial session trends for the three '***Testable***' segments (*Testable Adopters, Testable Trial, and No-RG Player)* overlap almost perfectly supporting the session's use as a pre-measure against which changes can be tracked (Figure 16).

- Second, in each of the four segments that had a trial session (*Testable and Non-Testable Adopter and Trial Players*) there is a distinct bump in money and games played during the initial trial session. Despite the distinctive nature of the trial session, it had been included in the post trial data. The decision to include the initial trial data in with the data for all the other post-trial sessions was made after analysis demonstrated that the unique characteristics of the trial session (e.g. *longer play sessions, higher bets*) were characteristics associated with RG sessions in general, and, that such effects were consistent over sessions and persisted unchanged well beyond the first session (see Section 3.1 and Section 3.2). Based on these results, it was argued that the first trial session involving RG use represented a significant proportion of the RG sessions for many players during the test period. Therefore, it was considered reasonable to use this

sample to increase the power (e.g. *number of sessions*) of the '*post*' trial values used in for General Linear Modeling (GLM Analysis).

COMPARABILITY OF PRE-TRIAL SESSION TIMEFRAMES

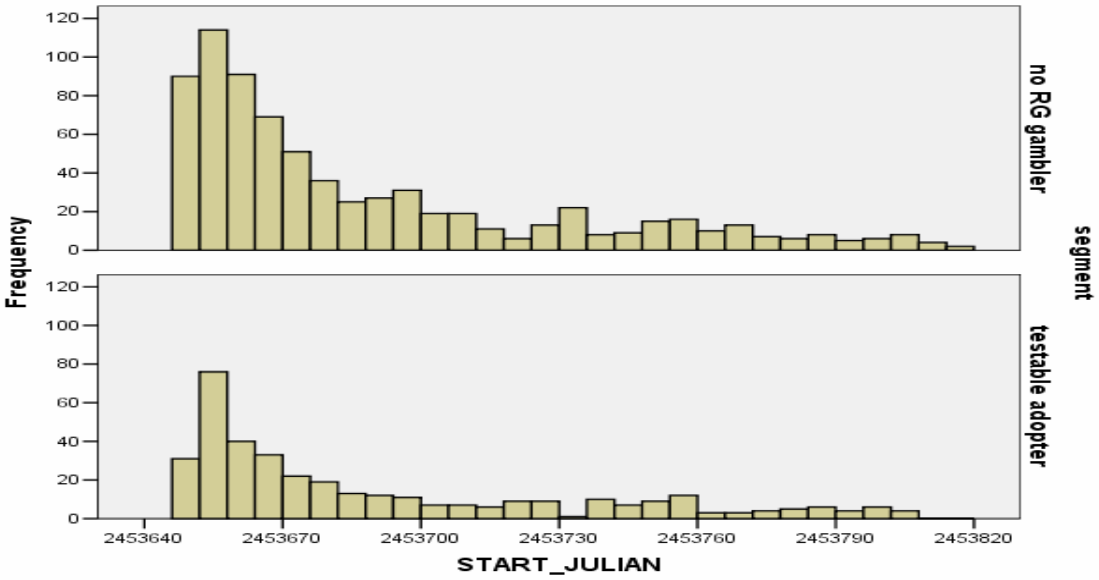
In designing the analysis, another issue arose that was related to timeframes surrounding the pre-measure benchmarks. Differences between the Testable RG Adopters and the No-RG Players in '*when*' the pre-trial sessions occurred could have implications for differences detected in the post-trial outcomes. The pre-trial sessions for the No-RG segment were operationally defined as the first three day-sessions during the test period. In contrast, the pre-trial sessions for the Testable Adopters were defined as a function of when they had first tried the RG features. It was possible that the first pre-trial day-session of the Testable Adopters occurred after they had played several sessions during the Trial period, thus shifting their pre-trial sessions to a later point in time during the trial.

The machine data from Techlink Entertainment included a variable for when the sessions started recorded as '*Julian Day*', a standardized number used to count days from a common starting point (e.g. *October 25, 2005 is 2453671*). This variable was used to conduct three comparisons examining the impact of session timing:

- Julian Day count for the first sessions used,
- Julian Day count for the second sessions used
- Julian Day count for all sessions used.

For illustrative purposes, the histograms for the middle (*second*) pre-trial sessions for each segment are presented below in Figure 18.

Figure 18: Histogram for Julian Date of the Second Pre-Trial



There was only a mean difference of two days for all the pre-trial sessions and for the second (middle) session, both of which did not differ significantly between the two segments ($p < .05$, using t-tests of significance for independent samples). The first session started an average of seven days later for the Testable Adopters, as was predicted, and this difference was significant at the $p = .098$ (two tailed) level. While this represents a marginally significant difference between the two groups in terms of the timing of the first session, the implications of the finding is offset by the fact that the start time only differed by one week. A mean difference of one week between when the first sessions of play occurred was considered reasonable and unlikely to have any implications for influencing differences in profiles. This position was further supported by the results for the other sessions comprising the pre-trial measurement; by the second session, and overall for all sessions, there was no difference in the average timing. Results supported the use of the pre-trial sessions for the Testable Adopters and the No-RG segment when comparing changes in play behaviors after the adoption of the RG System.

3.3.2 GLM Analysis of Average Session Expenditure by Adoption Segments: Design

In order to isolate the effects of adopting use of the RG features for gambling expenditures, analysis was conducted using the Repeated Measures ANOVA with covariates using the General Linear Model (GLM) module of SPSS v. 13.0. The dependent variable in the models is ***change in money spent per day-session*** (e.g. *money lost*) between the pre-trial and post-trial day-sessions. The independent variables *(factors)* in each model were the **RG Adoption segments**. These included overall adopters of the RG System (e.g. *on-going use of any of the features*), and segments defined by adoption/use of specific features of the system such as 'My Account', 'Live Action' or 'Money Limits'. As discussed earlier, the pre-trial session characteristics for both segments were found to be comparable.

REPEATED MEASURES DEPENDENT VARIABLES:

Pre Measure: Based on the three pre-trial sessions: *Average Money Spent per Session*

Post Measure: Based on the three to six post-trial sessions: *Average Money Spent per Session*

In order to maximize the stability of the post measures up to six consecutive sessions were used to derive the post estimates if these sessions were available.

INDEPENDENT VARIABLES (FACTORS): BETWEEN SUBJECTS FACTORS (DICHOTOMOUS VARIABLES)

Overall Adoption Measure: RG Adoption Segments (RG Adopters n= 121[12], No-RG Adopters n=247).

Feature Adoption Measures: Segments formed based on Factor Scores (Discussed below).

My Account Week and Month (Feature Users N = 50, Non-Users N = 318).

My Account activation and day (Feature Users N = 36, Non Users N = 332).

My Account Year (Feature Users N = 55, Non-Users N = 313).

Live Action (Feature Users N = 95, Non-Users N = 273).

[12] There was one RG Adopter excluded from the GLM analysis due to lack of clarity surrounding their use of the features. This individual's use of the system differed significantly from the other players comprising the group.

My Play Limit (Feature Users N = 29, Non-Users N = 339).

The inclusion of covariates in the models removes the "noise" in the data that may be masking the effects of key variables of interest and, at the same time, provides valuable insight as to the role of other behaviors/ characteristics that may be influencing differences in players' responses.

MODEL COVARIATE MEASURES:

1. Log of Average Post-Trial Sessions Length
2. Difference in payout rate per session bet between the pre-trial and post-trial sessions.
3. Difference in Average Credits Won per Session between the pre-trial and post-trial sessions

The three covariate measures were selected a priori based upon their relationship with the dependent variable. The first covariate, ***average post-trial session length*** was introduced into the model after analysis (*discussed in Section 3.1 and 3.2*) found that rates of money spent varied by length of session. Given the highly skewed distribution for the variable, the log transformation of the variable was used in the model in order to minimize the impact of outliers.

The second covariate, ***difference in payout rate per session***, was introduced to control for the influence of 'lady luck' (e.g. *randomness of wins*) on play behavior. The third covariate was also entered to reduce variance due to wins. Both covariates were found to be significant and were retained in the models.

3.3.3 Adopter Segment GLM Analysis - Repeated Measures Model

The results for the Repeated Measures Model analysis are presented using both a table format for the overall effects and charts for illustrating any significant relationships between the factors and the effects.

Interpretation of Tables

The results of the Repeated Measures Model analysis for the factors are presented in table format. Two numbers are presented for each variable in the respective models, indicating the effect of each covariate or factor. The first is the significance level for the variable in the analysis (*for purposes of this analysis, levels of $p \leq .10$ are considered significant).* The second statistic reported is the variance explained (Eta^2), which indicates the relative contribution of the variable in explaining the variance in the dependent variable (e.g. *change in measures between the Pre and Post Surveys*).

Interpretation of Charts

The charts provide the estimated mean for each dependent measure (e.g. *Pre and Post Expenditure per Session)* after taking into account the effect of the covariates. Therefore, the figures in the graphs do not represent the actual level of money spent but instead reflect estimates derived after the effects of the covariates have been parceled out of the measures. Thus, they represent the best profile of the estimated effect of the factors (e.g., *use of the RG System*) on change in the behavior or outcome being examined.

3.3.4 RESULTS OF REPEATED MEASURES MODELS

EFFECTS OF RGS ON AVERAGE EXPENDITURE PER SESSION

Table 10 - Average Amounts Spent per Session (Results of Repeated Measures Model)

	Use of RG Features	
	Sig	Eta^2
Covariates		
Post – Log of average play session length	0.000	0.217
Difference in Average Payout Rate per Session Between Pre and Post-Trial Sessions	0.050	0.011
Difference in Average Credits Won per Session Between Pre and Post-Trial Sessions	0.003	0.025
Adoption Factor		
Adopter and No-RG Segments	.022	0.014

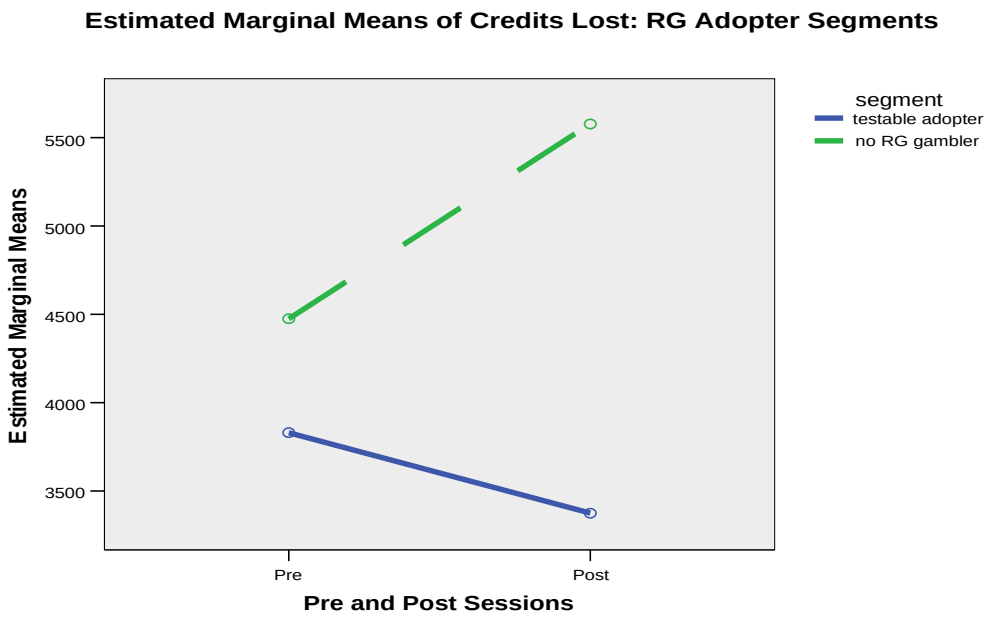
The above table and graph show the results of the Adopter Segment GLM model analysis.

All three covariates were significant at the $p<.05$ level with Eta squared values ranging from .011 to .217. The factor "Segment" which represented membership in either the Testable Adopter or No-RG segments is also significant at the $p = .022$ level and explained 1.4% of the variance in the dependent variable.

Not surprisingly, differences in session length between the pre and post-measures explained the majority of variance in changes in averages amount spent, with a small yet significant effect observed for changes in the pay-out rate and differences in the amounts won.

Most importantly, however, there was a positive impact detected for use of the RG features. Figure 19 illustrates the direction of the changes pre and post-trial for the two segments. As hypothesized, the RG Adopters reduced their expenditure in comparison to the No-RG Players.

Figure 19: Estimated Marginal Means of Changes in Expenditure by RG Use



CREATION OF RG FEATURE ADOPTION SEGMENTS

Twenty different variables were available that measured usage of the various aspects of the RG System. In order to reduce the number of variables that were to be examined, and to gain a better understanding of the underlying RG System usage patterns, principal component analysis with varimax rotation was used to derive five components that explained 84% of the original variance. The five factors are described in Table 10 below.

The factor loadings indicate the relative contribution of the individual variables to each factor. The variables used to derive the factor were also used to define the character of the resulting factor grouping. For example, the fourth factor is made up of those behaviors associated with the *Live Action* feature so it was named the '*Live Action Factor*'. People who scored highly on this factor were those people who made most use of this feature.

Table 11 : Factor Structure of The RG System Feature Usage

	Factor Loading
Factor One: My Account Week and Month	
Day-Session My Account Month	.88
Play-Session My Account Month	.88
Day-Session My Account Week	.84
Play-Session My Account Week	.84
Total Activations My Account Month	.82
Total Activations-My Account Week	.76
Factor Two: My Account Activation and Day	
Total Activations My Account Day	.84
Total Activations My Account	.83
Play-Session My Account Day	.75
Day-Session My Account Day	.75
Day-Session My Account	.69
Play-Session My Account	.68
Factor Three: My Account Year	
Total Activations My Account Year	.83
Day-Session My Account Year	.82
Play-Session My Account Year	.82
Factor Four: Live Action	
Play-Session Live Action	.97
Day-Session Live Action	.97
Total Activations Live Action	.80
Factor Five: My Play Limit	
My Money Limit Day	.80
My Play Limit	.78

Factor scores were saved and used to create five segmentation variables for use in the GLM analyses as 'factors'. Those who had a positive factor score for a particular factor grouping were included in analysis for that factor and characterized by the behavior associated with the particular factor grouping. Thus, those who had a positive factor score on the '*Live Action*

Factor' were designated as *Live Action Users*. These new segment variables were then inserted into five GLM modeling analyses to determine the relative contribution of each in influencing behavior.

Table 12: RG Feature Adoption GLM Analysis

	My Account Week and Month		My Account Activation and Day		My Account Year		Live Action		My Play Limit	
	Sig	Eta^2	Sig	Eta^2	Sig	Eta^2	Sig	Eta^2	Sig	Eta^2
Post – Log of average play session length	.000	.208	.000	.209	.000	.209	.000	.215	.000	.208
Difference in Average Payout Rate per Session Between Pre and Post-Trial Sessions	.066	.009	.061	.010	.076	.009	.060	.010	.049	.011
Difference in Average Credits Won per Session Between Pre and Post-Trial Sessions	.002	.026	.002	.027	.002	.026	.003	.024	.001	.028
Adoption Factor										
Adopter and No-RG Segments	.102	.004	.109	.004	.051	.007	.018	.012	.032	.009

One Tailed Alpha presented for Adoption Factor

The obvious hypothesis at the start of the analysis was that use of the RG features would lead to reduced expenditure. A two-tailed test of significance was considered too conservative in detecting significance (e.g. *reduced power*) and, therefore, the test was conducted and reported upon, using the one tailed alpha. Using .05 as the cut-off, three of the RG factors identified were significant, and the remaining two factors closely approached the criterion. Using the ***live action feature*** and ***setting play limits*** were associated most strongly with reduction in the amount spent. The evidence is that use of the other RG features also contributed to a reduction in expenditure. Although there is less certainty surrounding these results, there is still high probability that the features had a positive impact and this should lend support to the provision of such features as an aid to players.

3.4 Exploratory Analysis of RG Impact by Risk for Gambling Problems

The results indicated that use of the RG features was associated with a number of positive game outcomes that suggested improved play value and play management, including reductions in amount of money spent. However, other findings related to RG use, such as increases in time spent gambling, may have differential impact depending on an individual's risk for gambling problems. Given the nature of the findings for Regular VLT Players, insight as to the impact of RG use by risk for problem gambling was considered critical in defining next steps for the project.

The original study design did not explicitly allow for analysis of the player-card data by risk for problem gambling as this information was not gathered for all card members taking part in the trial.[13] Identification of risk was only obtained for approximately 158 individuals comprising a non-random, voluntary panel of players that were tracked over the course of the six-month trial during Stage III, the final stage of the research.[14] These panel members were administered the Problem Gambling Severity Index (PGSI) comprising the 9 scored items of the Canadian Problem Gambling Index (CPGI) in order to obtain a CPGI score that was subsequently used to classify the panel members into one of four segments: Non-problem (score=0); Low Risk (score=1-2); Moderate Risk (score=3-7) and Problem Gamblers (score=8+). With the exception of the panel members, there was no possibility of linking risk scores to the actual player data; no connection exists between the data tracked by each player card and any id information including demographics, player card number, name or contact information. This

[13] Two independent marketing research and communication firms were originally retained by NSGC to design and execute the RGD Research Project. Nucleus Consulting was responsible for methodology and product development testing whereas Omnifacts Bristol was responsible for designing and executing the player evaluation and RGD impact assessment in Stages I and Stages III. Readers are referred to NSGC for further information regarding these phases of the research and to the Final Report produced by Omnifacts Bristol for detailed findings surrounding the outcome of this research.

[14] There were 161 panel members originally recruited by Omnifacts Bristol to take part in Stage III of the study, of whom three individuals subsequently withdrew from the panel.

meant it was impossible to obtain risk scores for players in the database, even through re-contacting players for informed consent.

Therefore, the only means of assessing the current player database by risk for problem gambling was:

- *to link the player-card data to eligible panel members for whom risk scores were available in order to comparatively profile and examine use of the RG features; and then, if appropriate,*
- *use the panel sample to develop and/or test a model (algorithm) to identify higher-risk players with reasonable accuracy in order to assess the potential impact of RG use by risk using the entire player card dataset.*

3.4.1 PGSI Sample Analysis: Analysis of Player-card data for Panel Members

The goal of the initial analysis undertaken for the sample of panel members was to identify any indicators that adoption of the RG System may be causing harm to Players, particularly those scoring at moderate risk or problem levels. There were 141 of the 158 scored panel members eligible for inclusion in the analysis.[15]

Several analyses, similar to those conducted previously for regular VLT Players in Sections 3.1 to 3.3, including profiling of pre and post day-session characteristics, trend analysis of post RG session characteristics, and General Linear Modeling, proved inconclusive due to the small samples available for the player segments among the eligible panel members (see Table 13 below). For example, when the sample of 141 scored Players were broken out among the six segments by CPGI risk category, there were only 17 Problem Gamblers, four of whom qualified as Testable Adopters (Experimental Group) and only 2 who qualified for comparison purposes as No-RG Players (Control Group).

[15]Those panel members identified as bar staff cardholders and/or having shared their card on a frequent basis (n=3), or who had not used the card for playing purposes during the test period (n=14) were excluded from the analysis.

Table 13: Sample Sizes for Player Database Segments among PGSI Scored Players (Panel Members)

Sample Segment	CPGI Original Categories: No Risk	Low Risk	Moderate Risk	Problem Gambler	Total
Testable Adopter *(Pre & Post-Measures)*	11	8	8	4	31
Non Testable Adopter *(Pre-Measures Only)*	19	10	19	8	56
Testable Trial Player *(Pre & Post-Measures)*	2	1	4	1	8
Not Testable Trial Player *(Pre-Measures Only)*	3	2	4	1	10
No-RG Player *(Pre & Post-Measures)*	6	8	5	2	21
Non-Regular Player *(< 6 play sessions)*	7	6	1	1	15
Total	**48**	**35**	**41**	**17**	**141**

To gain insight into the nature of play amongst the various risk categories and to increase the number of observations (e.g. *sample size*), risk profiles were developed based on session characteristics of play (e.g. *number of play sessions by those in each risk category*) rather than just the number of Players falling in each segment:

- *Profile of session characteristics for all post-adoption sessions by PGSI risk category (Table 13)*
- *Profile of session characteristics for post-adoption RG sessions only by PGSI risk category (Table 14)*

SESSION CHARACTERISTICS FOR ALL POST-ADOPTION SESSIONS BY PGSI RISK CATEGORY (TABLE 14)

In order to produce session profiles by risk category, averages were generated for all post adoption sessions by PGSI category. The sample of sessions in each category is a mixture of **repeated measures** (e.g. *one player could contribute 50 sessions versus another player contributing 10 sessions of play*) and **independent measures** (e.g. *the session averages under the No Risk category represent the behaviors and outcomes of all play sessions during the test*

period by the 48 Players scoring at No Risk on the PGSI). Due to this combined approach, there is no appropriate statistical analysis for testing for significant differences between or among the segments. However, there is descriptive and practical value in comparing the resulting profiles.

Table 14: Day-Session Profiles by PGSI Categories

	Averages Post Adoption Play Only			
Session Characteristics	**No Risk**	**Low Risk**	**Moderate Risk**	**Problem Gambler**
Number of Total Day-Sessions	**n = 1719**	**n = 1269**	**n = 1743**	**n = 749**
(Total Players)	*(n= 48)*	*(n=35)*	*(n=41)*	*(n=17)*
Money Lost Per Session *(e.g. Money spent out-of-pocket, not including current session winnings)*	$53	$36	$39	$50
Average Session Length *(e.g. Play Time in Minutes)*	89.3	77.6	70.0	112.9
Percent Long Sessions *(e.g. Day-sessions lasting Over 2 Hours in length)*	35.9%	35.3%	30.6%	50.7%
Card Insertions per Day *(e.g. Average number of times the card is inserted and removed each day)*	2.30	2.27	2.13	3.56
Percent Sessions Start 9 am to 11 am	9.7%	7.6%	7.7%	10.9%
Percent Sessions Start 11 am to 2pm	19.3%	26.0%	26.1%	21.6%
Percent Sessions Start 2pm to 6 pm	26.0%	32.7%	32.9%	33.2%
Percent Sessions Start after 6 pm	45.0%	33.6%	33.3%	34.2%
Percent Losing Sessions *(e.g. Percent of sessions, on average that ended in a negative cash outcome for the player)*	76.4%	69.1%	71.9%	72.1%
Percent Winning Sessions *(e.g. Percent of sessions, on average that ended in a positive cash outcome for the player)*	21.1%	25.1%	24.8%	23.8%
Percent of Post Adoption Sessions When RG Features Were Activated *(Following adoption of the RG feature, the average percent of sessions that players activated an RG feature)*	28.8%	19.3%	33.6%	39.8%
RG Feature Usage				
Average Number of RG Activations per Session	2.44	1.73	3.16	3.38
Percent Sessions Used Live Action	38.0%	26.9%	23.2%	47.3%
Percent Sessions Used My Account	28.0%	15.8%	34.8%	18.3%

Table 14 Continued : Day-Session Profiles by PGSI Categories - Session Cahracteristics	Averages Post Adoption Play Only			
	No Risk	Low Risk	Moderate Risk	Problem Gambler
Number of Total Day-Sessions	n = 1719	n = 1269	n = 1743	n = 749
(Total Players)	*(n= 48)*	*(n=35)*	*(n=41)*	*(n=17)*
Percent Sessions Used My Account Day	16.2%	9.1%	22.9%	10.1%
Percent Sessions Used My Account week	7.5%	5.0%	10.8%	7.2%
Percent Sessions Used My Account month	7.2%	4.4%	10.2%	7.2%
Percent Sessions Used My Account year	8.8%	4.5%	11.1%	7.7%
Percent Sessions Used Stop 48	0.23%	0.07%	0.06%	0.000%

As would be expected, **Problem Gambler play sessions, compared to sessions by Low and Moderate Risk Players, on average, were characterized as having higher expenditures ($50 versus $36-$39), occurred over longer periods of time (113 minutes versus 70-78 minutes), with more sessions lasting over two hours (51% versus 31%-35%), and involved more card insertions each day of play (3.6 times versus ≈2.2 times).** Among Low Risk, Moderate Risk and Problem Players there was no appreciable difference observed for the time of day when play sessions occurred (e.g. 2-6 p.m. ≈33%) or the percent of session that ended in a loss position (69% to 72%).

It is noteworthy that sessions for the No Risk segment (PGSI=0) do not conform to expectations regarding session profiles. It was reasonable to expect session characteristics among the No Risk group to be more positive in comparison to the other three risk segments. However, compared to play sessions by Low and Moderate Risk Players, on average, session outcomes among the No Risk group included the highest recorded amounts spent ($53 versus $36-$39), the highest percentage of lost sessions (76% versus 69%-72%), and longer sessions of play (89 minutes versus 70-77 minutes). The implications of these findings for the No Risk group are discussed on page 82.

In terms of RG use, the Problem Gamblers had the highest activation rate as a percent of sessions and on a per session basis. This segment showed a clear preference for '***Live Action***'

(47.3% of sessions) and a relatively low preference for '***My Account'*** (18.3%) and '***My Account Day'*** (10.1%), especially compared to the No and Moderate Risk segments. It is interesting to note that none of the panel members triggering as Problem Gamblers on the PGSI activated the Stop 48 feature.

The Moderate Risk segment activated the '***My Account'*** (34.8%) and ***My Account Day'*** (22.9%) features almost twice as often as the Low Risk and Problem Player segments.

SESSION CHARACTERISTICS FOR POST-ADOPTION RG SESSIONS ONLY BY PGSI RISK CATEGORY (TABLE 15)

In order to examine RG session characteristics among the various risk categories profiles were created for those sessions in which an RG feature was activated.

Table 15: RG Session Profiles by PSGI

Session Characteristics	Averages Post Adoption Play for RG Sessions Only			
	No Risk[16]	Low Risk	Moderate Risk	Problem Gambler
Number of RG Sessions	N = 495	N = 282	N = 586	N = 298
(Total Players)	*(n= 48)*	*(n=35)*	*(n=41)*	*(n=17)*
Session Length (Minutes) *(e.g. The amount of time the card was inserted into the machine, on average, each session)*	144	110	107	177
Percent of Sessions over Two Hours in Length (e.g. *Length of play time*)	50.3%	37.2%	36.5%	61.4%
Money In *(e.g. Total amount of money put into the machine, on average, each session; **'Cash-in'**)*	$408.61	$300.73	$363.71	$420.29
Money Out *(e.g. Total amount of money cashed out of the machine, on average, each session; **'Cash-out'**)*	$326.42	$254.43	$306.60	$362.70
Money Played *(e.g. Average amount wagered/bet including winnings used for additional play)*	$1,308.88	$1,036.44	$1,038.58	$1,251.00
Money Won *(e.g. Total winnings that occurred during the play session)*	$1,226.66	$990.14	$981.46	$1,193.41

[16] Play behaviours observed for those test-panel members scoring at No Riks

Session Characteristics Con'd	Averages Post Adoption Play for RG Sessions Only			
	No Risk	Low Risk	Moderate Risk	Problem Gambler
Number of RG Sessions	N = 495	N = 282	N = 586	N = 298
(Total Players)	*(n= 48)*	*(n=35)*	*(n=41)*	*(n=17)*
Money Lost *(e.g. Average amount spent by the player, out-of-pocket, not including reinvestment of winnings)*	$82.23	$46.30	$57.11	$57.59
Games Played *(e.g. Average number of 'spins/pulls' per hour of play)*	1,671	1,273	1,214	1,843
Cash-out Percent *(e.g. Average percent cashed out of the machines as a percent of the total amount of money put into the machine; **'Money In/Money Out'**)*	80.73%	76.76%	80.65%	84.52%
Percent Winning Sessions *(e.g. Percent of sessions, on average that ended in a positive cash outcome)*	26.3%	29.8%	29.2%	29.5%
Percent Losing Sessions *(e.g. Percent of sessions, on average that ended in a negative cash outcome)*	72.3%	67.4%	68.9%	67.4%
RG Usage Activation per RG Session *(e.g. Average number of times the RG feature was used each play session)*				
Live Action	3.178	2.230	1.630	6.017
My Account	1.873	1.773	3.476	0.607
My Account Day	1.109	2.085	2.334	0.574
My Account Week	0.325	0.496	0.420	0.201
My Account Month	0.291	0.397	0.379	0.205
My Account Year	0.364	0.454	0.384	0.238
My Money Limit Day	0.034	0.018	0.026	0.007
My Money Limit Week	0.000	0.000	0.000	0.010
My Money Limit Month	0.002	0.000	0.002	0.000
My Play Limit	0.085	0.128	0.032	0.027
My Play Limit Day	0.002	0.004	0.000	0.000
My Play Limit Week	0.000	0.000	0.000	0.000
My Play Limit Month	0.000	0.000	0.000	0.000
My Play Limit Calendar	0.000	0.000	0.000	0.000
Stop 48	0.006	0.004	0.002	0.000

Compared to the Low and Moderate Risk groups, play sessions by Problem Gamblers, on average, tended to be longer (177 minutes versus 107-110 minutes) with a higher proportion lasting two or more hours (61% versus ≈37%) and had higher per session expenditure ($1,250

versus ≈$1,037). **The cash-out rate for play sessions by the Problem Gamblers was marginally higher (84.5% versus 77%-81%) although the percentage of winning sessions was the same as that observed in the other segments (≈67%). However, despite higher wagering, average losses in RG sessions did not differ for the Moderate or Problem Gamblers (≈$57)** and was actually lower than for RG play sessions by the No Risk Players (≈$82)

There was again a marked difference observed for RG use in play sessions by Problem Gamblers as compared to activations by the other segments. Play session by Problem Gamblers had two to four times as many '***Live Action***' activations compared to the other segments (6.0 times versus 1.6 - 3.2 times). Conversely, the number of '***My Account***' activations was only one-third to one-fifth that observed in play sessions by those in the other segments (.6 times versus 1.8 to 2.3 times).

Again, the profile of play sessions for Problem Gamblers and the No Risk segment was found to be highly similar.

Although sample sizes for the panel members were too small to address conclusively the impact of the RG System by risk for problem gambling, a comparison of session profiles by each risk segment provided insight about differences in use of the features, session characteristics, and outcomes.

NO RISK PLAYER PROFILES

The profile of session characteristics for those panel members identified as No Risk Gamblers was highly similar to profiles obtained for those identified as Problem Gamblers, suggesting there may have been issues for panel respondents in answering the questions comprising the PGSI screen for the Canadian Problem Gambling Index. Alternatively, the PGSI may be ineffective in identifying risk for some participants; in particular, for those who were only manifesting high-risk behaviors and have not yet accrued the consequential impacts largely measured by the CPGI screen (e.g. *guilt, impacts for others,*

financial difficulties). However, given the consistency of player profiles for those scoring as non-problem gamblers in numerous prevalence studies and other research, it appears that the methodology for the panel study conducted in Stage III of the RGD Project has played a role in influencing results. It is most likely that some participants felt threatened by disclosure and resisted providing accurate screening information. Consequently, these Players would be incorrectly assigned to the No Risk segment. According to the methodology reported by Omnifacts Bristol, the PGSI was administered after participants agreed to take part in the study. Participant responses were not anonymous and were tracked over a six-month period. Anecdotal feedback reported by Omnifacts Bristol indicated that some VLT panel members had been reluctant to take part in the panel due to the monitoring component. It appears some Players may also have been reluctant to disclose the true nature of their gambling involvement due to these same concerns. Whatever the case, the profile of No Risk Players on the player panel was not found to be a reliable estimate of behavior for this segment although the screen did appear to discriminate among Low Risk, Moderate Risk, and Problem Players. The player data for those scoring as No Risk Players on the Omnifacts Bristol player panel should be used with caution and in the current analysis was not used to discriminate or assess difference between problem and non-problem behaviors.

PLAYER RESPONSE BY RISK FOR GAMBLING PROBLEMS

Overall, Problem Gamblers appeared to derive different value from the RG system as compared to those in the other player risk segments. They made significant and repeated use of the 'Live Action' feature during their play sessions, which is an informative feature relevant for current session expenditure and outcomes only (e.g. *wins, losses, spend limits set by the player*). Problem Gamblers were less inclined to have used 'My Account', a control feature that tracks cumulative, historical expenditure, wins, and amount spent over time (week, month, year). Thus, the repetitious use of 'Live Action' during a play session suggests that this feature was enhancing play value and the gambling experience in particular for the Problem Gambler. It is also possible that they found that use of the Live Action feature was a better way for them to control their play at a session level

although low use of the 'My Account' feature suggests they used the RG system less often for controlling or monitoring their on-going gambling behaviour than for obtaining feedback on their immediate play session.

Comparison of the session profiles indicated it was possible that the Problem Gambler reacted differently to the RG System and used it to enhance their gambling experience, not as much for purposes of controlling or limiting their play but rather, perhaps, as information to improve their play of the games either experientially or financially. Given the longer playtimes, higher cash-out and no change in expenditure associated with RG use, this appears to be a reasonable expectation.

3.4.2 Modeling and Examining High Risk Players among all Player Card Members

This section outlines an alternative approach to examining the potential impact of the RG System on Players exhibiting different degrees of risk for problem gambling; development of a model. Since small sample size was identified as the primary impediment to using the test-panel to reach conclusions regarding impact of RG use by risk, a model that was able to predict risk among all eligible player card members (n=1,824) would yield sufficient sample sizes to explore the issue in greater detail.[17]

Development and use of a model to predict risk among all members of the player-card database consisted of four steps:

1. ***Developing and testing variables hypothesized to be associated with problem gambling***
2. ***Using CPGI-PGSI scores for panel member data to define high and low risk test samples (Low Risk, Moderate Risk and Problem Gambling)***
3. ***Building a model to predict assignment to higher or lower risk segments among the eligible scored panel members***

[17] There were 30 Casual Players excluded from the analysis (n= 953 versus 983) due to insufficient data for modeling purposes reducing the total number of players from 1,854 to 1,824.

4. ***Using the derived model to determine the probabilities of segment membership for the total sample of 1,854 trial participants.***

5. ***Testing the impact of RG use among those classified as higher-risk Players by the model***

Step 1 ⇒ Developing and Testing the Variables

The day-site session data for the sample of 1,854 trial participants, consisting of 29,051 day-site sessions over the whole trial period, were used to derive a new data set of 1,824 cases comprised of seventy three variables per case. Each variable was derived based on hypothesized relationships to problem gambling and analysis of the play data to identify appropriate categories and cut-off points. Some examples of the variables created were '***Chase200***': *the percentage of sessions whereby the player returned the next day to gamble after a loss of $200 or more the previous day*, and; '**Extrasites**': *the percent of sessions played at sites other than the first site played at on that day*. In both cases, it was first hypothesized that Players who scored high on these variables were more likely to be high-risk or Problem Gamblers. The variables were then tested on the panel member data using a cut-off score of 5+ on the Problem Gambling Severity Index of the CPGI to classify Players as higher-risk. Of the seventy-three variables tested using Spearman Correlation, 19 of the hypotheses were confirmed at $p < .05$ level, and another seven were confirmed at $p < 0.10$ level. One variable was significant at the $p=.10$ level in the opposite direction of that hypothesized (i.e. negatively correlated).

Step 2 ⇒ Creating High and Low Risk Player Segments

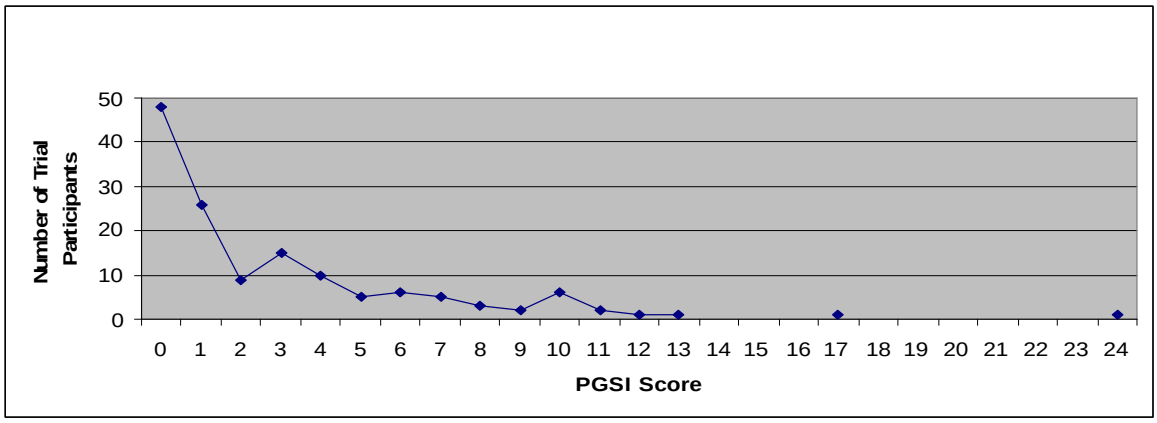
The PGSI test scores were attached to the new data file for the 140 panel members who were tested during Stage III of the research[18]. The scored test-panel members were broken into two groups, higher-risk Players defined as those scoring five or more on the CPGI, and lower-risk Players, those scoring 4 or less on the CPGI. (Analysis using those scoring 8+ was attempted,

[18] One panel member reported a score of 24 on the PGSI suggesting that they had simply selected the maximum choice for almost all screening questions. As this response represented an outlier in the current sample and there was uncertainty surrounding the validity of the response this person was excluded from the analysis.

but the sample of only 17 Problem Players proved too small to yield a usefully predictive equation)

Two factors were taken into consideration is selecting the 5 point cut-off on the CPGI-PGSI scores for defining risk; first, the need for a sufficient sample size for the 'target population', and second, the fact that the distribution of scores showed a scree point at the 5+ point value suggesting this was a natural breakpoint. This resulted in 33 of the test-panel members being designated as at higher-risk and 107 designated as at lower-risk.

Figure 20: Frequencies of PGSI Score for 141 Panel Participants



Step 3 ⇒ Creating the Model

Stepwise Logistic Regression was used to develop a model to predict membership in the higher and lower-risk segments. The cases comprising the higher-risk segment were first weighted by a factor of three so that the two segments had roughly equal representation in the dependent variable. This was necessary in order to optimize the equation's ability to estimate membership in both segments. The final model contained nine variables, all coefficients significant at the $p<.05$ level or greater. Due to the use of weighting, the overall statistics for the model reported by SPSS will not be accurate and, therefore, are not reported here. Instead, the effectiveness of the model was evaluated by testing the accuracy of its predictive ability in identifying the test-panel members using the unweighted dataset.

Table 16: Means for Predicted Probability for the two PGSI Score Segments

PGSI Score Segments	Mean of Probability	N	Std. Deviation
Lower Risk Players (CPGI Score <5)	.3502009	107	.21969140
Higher Risk Players (CPGI Score =5+)	.6215000	33	.22935243
Total	**.4141500**	**140**	**.24954167**

F = 37.77, df = 139, p < .000

The means of the predicted scores in Table 16 were very different (.35 for the Lower-risk CPGI-PGSI Score Segment versus .62 for the Highe-risk Player Segment) which is significantly at the p < .000 level. This indicated that the overall model was significant.

Table 17: Predicted Membership in each PGSI Score Segment

PGSI Score Segments	Predicted Segments	
	Score 0 – 4	Score 5+
Lower Risk Players (CPGI Score <5)	83 (77.6%)	**9 (27.3%)**
Higher Risk Players (CPGI Score =5+)	24 (22.4%)	**24 (72.7%)**
Total	**107 (100%)**	**33 (100%)**

Table 17 shows that 73% of those scoring 5+ on the PGSI screen were correctly predicted to be in the higher-risk segment which is a reasonable level of accuracy. However, of those predicted to be at 'higher-risk', half had scored at low-risk levels of 0 – 4 on the PGSI screen. To clarify the profiles the PGSI score was produced for each of the predicted segments (lower-risk versus higher-risk) (see Table 18 below).

Table 18: PGSI Scores for Predicted Low Risk and High Risk Segments

PGSI Score	Lower Risk Prediction	High Risk Prediction
0	42.4%	**18.8%**
1	20.7%	**12.5%**
2	6.5%	**6.3%**
3	10.9%	**10.4%**
4	9.8%	**2.1%**
5	1.1%	**8.3%**
6	4.3%	**4.2%**
7	2.2%	**6.3%**
8+	2.2%	**31.2%**
Total	**100%**	**100%**

Over 80% of those predicted to be higher-risk Players scored at some level of risk (1+) on the PGSI and 63% scored at 3 points or more categorizing them as Moderate Risk or Problem Gamblers. Of the 17 Problem Gamblers in the sample, 16 were correctly predicted to be at high risk. (There was one Problem Player predicted to be at low-risk who had scored 24 on the PGSI. Refer to Figure 27. The data was suspected to be inaccurate for this respondent and, thus, this individual was subsequently excluded from further analysis).

Step 4 ⇒ Applying the Model to the Play Card Database

The logistic equation derived in Step 3 was used to compute probabilities of segment membership for the total sample of 1,824 trial participants. Forty percent of the total player base was identified as being at higher-risk compared to only 24% for the CPGI scored test-panel (n=140). This difference is primarily due to the bias in the sample characteristics of those comprising the test-panel. First, the panel was comprised of a convenience sample and was not randomly selected and, therefore, was not representative of players in the area. Second, there were criteria set for the study that restricted participant selection for the test-panel (See Omnifacts Bristol Stage III Final Report). Before being administered the problem-gambling screen, prospective panel members had to agree to provide information on their play behavior over the course of the six-month trial and were not eligible for participation if they played any gambling machines outside of the test area including an adjacent First-Nation Gaming site) or had gambled at a Casino. These conditions were expected to reduce participation among those likely to be at higher-risk for gambling problems.

The lower and higher-risk player groups identified by the model were broken out by the RG Adoption segments (Table 19). Assuming the predictive ability of the equation among the Adoption segments is similar to that obtained using the test-panel sample, the group of players classified as being at higher-risk by the model likely contains 20% of No Risk and 20% Low Risk Players and virtually all the Moderate Risk and Problem Gamblers.

Table 19: Predicted Risk (High versus Low) for Players in each Adoption Segment

Predicted Risk Segments	Trial Adopter Segments						
	Testable Adopter	Non-Testable Adopter	Testable Trial	Non-Testable Trial	No-RG Player	Non-Regular Player	**Total**
Lower Risk	73 (59.8%)	178 (61.0%)	58 (63.0%)	69 (58.5%)	157 (63.6%)	565 (59.3%)	**1100 (60.3%)**
Higher Risk	49 (40.2%)	114 (39.0%)	34 (37.0%)	49 (41.5%)	90 (36.4%)	388 (40.7%)	**724 (39.7%)**
Total	**122 (100.0%)**	**292 (100.0%)**	**92 (100.0%)**	**118 (100.0%)**	**247 (100.0%)**	**953 (100.0%)**	**1824 (100.0%)**

Step 5 ⇒ Developing and Testing the Variables

The Higher-Risk and Lower-Risk Player segments identified by the predictive model were broken out into two groups; **Testable Adopters** (Higher-Risk: n = 49; Lower-Risk: n=73) and **No-RG Players** or Non-Adopters (Higher-Risk: n=90; Lower-Risk: n=157). Pre and post-adoption session characteristics were then analyzed to identify trends and play behaviors that might indicate risky behavior accruing from adoption of the RD System (see Tables 20 and 21).

Table 20: Comparison of Pre-Post Session Characteristics for Higher Risk Players by use of RG Features (Adopters versus No-RG Players)

Session Characteristics	Pre and Post Adoption for Higher Risk Segment			
	Testable Adopter (Experimental Group) N = 49		No-RG Player (Control Group) N = 90	
	Pre RG Adoption	Post RG Adoption	Pre RG Adoption	Post RG Adoption
Average Money In *(e.g. Total amount of money put into the machine, on average, each session; **Cash-in**)*	$257.99	$283.24	$243.86	$244.17
Average Money Out *(e.g. Total amount of money cashed out of the machine, on average, each session; **Cash-out**)*	$197.50	$239.11	$174.54	$188.28
Average Money Played *(e.g. Average amount wagered each session including winnings used for additional play)*	$831.93	$949.00	$1,004.84	$1,039.05
Average Money Won *(e.g. Average, total winnings that occurred during the play session)*	$771.44	$904.86	$935.52	$983.16
Average Money Lost *(e.g. Average amount spent by the player, out-of-pocket, each session not including reinvestment of winnings)*	$60.49	$44.14†	$69.32	$55.89
Average Play Duration Session *(e.g. The amount of time the card was inserted into the machine, on average, each session)*	92.8	103.6	92.7	98.6

Table 20 Continued: Comparison of Pre-Post Session Characteristics for Higher- Risk Players by use of RG Features (Adopters versus No-RG Players)	Pre and Post Adoption for Higher Risk Segment			
	Testable Adopter (Experimental Group) N = 49		No-RG Player (Control Group) N = 90	
	Pre RG Adoption	Post RG Adoption	Pre RG Adoption	Post RG Adoption
Days Between Sessions	5.2	3.5	10.3	9.6
Money Per Play Hour *(e.g. Average amount of money wagered per hour of play on the machines)*	$532.72	$529.75	$646.65	$611.18*
Games Per Play Hour *(e.g. Average number of 'spins/pulls' per hour of play)*	637	611*	605	615
Cash-out Rate *(e.g. Average percent cashed out of the machines as a percent of the total amount of money put into the machine; '**Money In/Money Out**')*	68.6%	77.1%*	71.8%	74.4%

Significant difference at † p≤.20 level, *p≤.10 level; ** p≤.05 level ***p≤.01level

There were few differences observed in either of the higher-risk player groups. Among those Higher-Risk Players who did not adopt the RG System there was few changes observed in play behavior or session characteristics based on the first three sessions of their play (e.g. *pre-measure*) compared to up to six sessions that followed (e.g. *post-measure*). Essentially the amount of money put into the machines remained constant, session length increased by a few minutes *(≈93 minutes to 99 minutes*) and frequency of play remained the same (*on average, playing approximately once every 10 days*). A small increase in cash-out rates was observed (≈72% versus ≈74%) which corresponded to a reduction in amounts spent of $13.43, or 19.4% of the pre-session average, however, none of these findings was significant.

Among the Higher-Risk Players who adopted use of the RG system there were a few changes observed in session characteristics and game outcomes following adoption, including increases in the average amount of money wagered ($283 versus $258), longer session length (≈104 minutes versus ≈93 minutes), higher amounts won ($904 versus $771) and in frequency of play (playing about 8-9 times per month versus 5-6 times during the pre-measure), although none of these changes were statistically significant at even the 80% confidence interval (p<.20). The only significant changes observed were a decline in the number of pulls/spins per hour (611 versus 637) and, on a per session basis, improved cash-out rates such that their expenditure per

session dropped $16.35 or 27.0% of pre-adoption losses (p=.169). The drop in the amount spent per session was offset by the increased frequency of play such that the estimated monthly out-of-pocket expenditure pre-adoption was about $350.00 compared to about $375.00 for a post-adoption month (assuming a 30-day month).

Table 21: Comparison of Pre-Post Session Characteristics for Lower- Risk Players by use of RG Features (Adopters versus No-RG Players)

Session Characteristics	Pre and Post Adoption for Lower Risk Segment			
	Testable Adopter N = 73		No-RG Player N = 157	
	Pre RG Adoption	Post RG Adoption	Pre RG Adoption	Post RG Adoption
Average Money In *(e.g. Total amount of money put into the machine, on average, each session; **Cash-in**)*	$168.72	$233.03**	$119.15	$133.65*
Average Money Out *(e.g. Total amount of money cashed out of the machine, on average, each session; **Cash-out**)*	$130.77	$196.10**	$87.80	$90.50
Average Money Played *(e.g. Average amount wagered each session including winnings used for additional play)*	$578.57	$735.33**	$503.00	$565.07*
Average Money Won *(e.g. Average, total winnings that occurred during the play session)*	$540.62	$698.40**	$471.65	$521.90
Average Money Spent *(e.g. Average amount spent by the player, out-of-pocket, each session not including reinvestment of winnings)*	$37.95	$36.93	$31.36	$43.16*
Average Play Duration Session *(e.g. The amount of time the card was inserted into the machine, on average, each session)*	74.0	94.2**	67.4	68.0
Days Between Sessions	3.4	3.0	9.0	9.2
Money Per Play Hour *(e.g. Average amount of money wagered per hour of play on the machines)*	$440.73	$469.72	$425.72	$460.70**
Games Per Play Hour *(e.g. Average number of 'spins/pulls' per hour of play)*	638	656	660	660
Cash-out Rate *(e.g. Average percent cashed out of the machines as a percent of the total amount of money put into the machine; **'Money In/Money Out'**)*	70.3%	83.5%**	77.1%	67.6%*

Significant difference at *p≤.10 level; ** p≤05 level ***p≤.01level

The Lower Risk Adopters also increased the level and degree of play per session after adoption of RG use but there was no change observed in their frequency of play and no change in amounts spent. This meant that Lower-Risk Players who took up use of the RG features, on average, played longer and won more, yet accrued the same amount of out-of-pocket expenditure suggesting improved play value for those using the RG system. The lack of change in the amount of money spent was again reflected in the increase in cash-out rate (≈70% versus ≈83%) for this segment following adoption. In contrast, the Lower-Risk Players who did not use the RG features also exhibited increased play involvement but this resulted in higher expenditure, on average, per session and reduced cash-out.

4.0 Conclusions and Recommendations

The player-card database represents the most accurate source of VLT behavioral data available for analysis. As the first study in the world to collect VLT player-card data there is much to be learned from this rich, unique dataset. However, in the current study analysis was focused solely on using the database to isolate and identify relevant impacts of the RG features tested during the trial. The primary challenges in addressing these study objectives were the lack of a baseline measure of behavior established prior to activation of the System's RG features and lack of information regarding player risk for gambling problems (e.g. CPGI score) among those using the machines during the field test. Moreover, the analysis of the data contained in the player-card database is exclusive to those players who took part in VLT gaming in the test area during the trial period. Therefore, it was not possible to use this data source to assess changes in behavior that may have occurred before and after the RG System became mandatory (*e.g. the number of players that stopped or reduced play in response to mandatory use of a player card*).

For those players active during the trial, it was necessary to generate pre-post measures. While the establishment of benchmarks was developed systematically and rationally, the impact of RG use could only be statistically modeled among those players for whom a baseline measure could be created. However, findings among this group of players were supported by the identification of similar trends and signature play when profiling differences in RG versus non-RG play sessions even among those who immediately adopted use of the features (*e.g. those players for whom baseline measures could not be calculated*). It was also possible, using the player-card data and a variety of analytical techniques, to identify additional confirmatory impacts associated with feature use, although direct causality was difficult to ascribe with certainty and the length of the trial (six months) pre-empted any assessment of longer-term impacts.

There were issues related to the assessment of RG impact by risk for problem gambling, primarily related to the need to develop a model for identifying risk. Given that risk assessment for problem gambling (e.g. CPGI scores) was only available for the 140 test-panel members, there was not enough data for using a holdout sample to test for a positive bias in the predictability of the derived equation (e.g. model). However, the Principal Investigators for the

study were able to draw on experience with analysis of other gambling machine databases and customize previous learning for use with this particular dataset. Notwithstanding these limitations, the risk segmentation yielded two groups that had distinctive playing patterns consistent with respective risk profiles (lower versus higher-risk players). The exploratory analysis provided sufficient insight as to the impact of the features to be of assistance in future planning.

4.1 Summary of Key Findings

- **Trial of the RG features was high.**

  There was high trial and use of the RG features among players, especially regular players who accounted for about 94% of revenues during the field test. The majority (71%) of regular players tried at least one of the features, especially My Account (68%) and Live Action (59%), although at least 11% used the control features to set spending limits primarily on a daily basis and 2% self-excluded for at least a 48 hour period. There was no negative behavioral impact detected in relation to the RG System for those who used the features or for those who chose not to use the features. The findings indicated that the system had minimal impact for those who did not decide to use any of the voluntary features insofar as there were no reductions or significant changes in play behaviors (e.g. *session length*, *frequency of play*) observed among those who did not try any of the features, with the exception that expenditure increased for this group over the trial.

- **Continued use (e.g. *adoption)* of the RG System was high especially among relevant target populations.**

  Once a player had tried any of the RG features almost two-thirds (65%), continued to use the features during additional play sessions. On-going use was particularly high among the more frequent players in the Windsor-Mount Uniacke area with almost half (48%) of those characterized as Regular VLT Players taking up continued use of the features (e.g. *RG Adopters).* Since these RG Adopters collectively were responsible for ≈ 61% of all play sessions during the trial period it was assumed this group was an important target for supporting responsible gambling decisions.

- **There were specific and consistent session characteristics associated with use or adoption of the RG features.**

  Comparative analysis consistently found that use of the RG system was associated with longer play sessions, increased wagering activity (e.g. *higher amounts of money put into the machines during play*), higher winnings (e.g. *higher amounts won during play*), and higher cash-outs (e.g. *higher amounts of money cashed out during the session*). At the same time there were no changes observed in the amount of money lost (e.g. *the amount of money spent out-of-pocket by the player*) nor was there any change observed in the frequency of play (e.g. *rate of play*). However, there were increases in the percent of sessions ending in a positive or 'win' outcome (e.g. *percent winning sessions*) and in the percent of money that players cashed out as a percent of the amount they put into the machine (e.g. *cash-out*).

- **RG use and impact was stable and persisted over time with evidence of a decline in amount spent emerging with extended use.**

  Although the field test was only six-months in length it was important to determine whether use of the features and the associated behavioral impact persisted over time, in particular as the novelty of the system declined. It was found that once players adopted use of the features, their usage pattern was consistent and stable up to 24 sessions following trial of the features, well beyond the period when most players could be expected to be still learning the system. When specifically examined among those who played 18+ sessions during the test period, there was no evidence of any change in amounts spent out-of-pocket for those sessions in which a RG feature was activated even when specifically examined over the last 13 to 24 sessions of play. Therefore, indicating use of the features and the associated impacts of that use were very stable over time.

- **There was a stronger effect for RG use observed in short sessions (<2 hours) when players typically are most likely to be in a loss situation (e.g. *minimizing expenditure or cashing out wins*).**

Longer play sessions tend to be associated more often with winning sessions, as the player is able to use winnings to extend their length of play. In contrast, shorter sessions usually occur because players run out of money sooner or reach their desired money limit. This means that shorter sessions are more often associated with losing sessions *(e.g. percent of sessions that end with the player having 'lost' money; that is ending play with less money than they had started with*) and lower rates of cash-out (e.g. *the percent of cash the player takes out of the machine as a percent of the total amount of money they put in*). Due to this relationship, it was important to assess RG use relative to session length. As expected cash-out rates (85%-88%) and percent winning sessions (30-32%) were higher during longer sessions of play (2+ hours) regardless of use of the RG features. Outcomes differed markedly for shorter sessions (<2 hours of play) with RG use, on average, associated with higher cash-out (≈77% versus ≈56%) and a higher rate of winning sessions (≈28% versus 20%). This same relationship was borne out when Adopters were compared to No-RG Players with the exception that after 30 minutes of play the cash-out rates for all Adopter sessions was consistently and significantly higher than rates for Non-Adopters (≈81% versus 69%, p<.001).

- **When other factors associated with expenditure were controlled for (i.e. *session length, pay-out rate and amount won per session*), the use of the RG features was found to be significantly associated with a decrease in expenditure especially for use of '*Live Action*' '*My Account Year*' and '*Setting Limits*'**

  No-RG Players (Control Group; n=247) and RG Adopters (Experimental Group; n=122) were used to test for differences in session characteristics before and after adoption of the features *(e.g. pre-post comparison).* A positive impact was found for use of informational RG features ('*Live Action*' and "*My Account*') and the control RG features ('*My Money Limits*', '*My Play Limits*', *'48-Hour Stop'*). There were no significant differences in pre-session profiles *(e.g. session characteristics prior to adoption*), with the exception that the RG Adopters played more often (on average every 3.2 days versus 9.2 for No-RG Adopters). However, following trial, the RG Adopters had longer play sessions, won more

money, and had reduced expenditures. Using Repeated Measures ANOVA with covariates (GLM Analysis) to control for the effects of session length, luck (*amount won per session*), and game design (*pay-out rates*) a significant effect was detected for use of the features; '*Live Action*'; '*My Account Year*' and '*My Play Limit*'. As hypothesized, those players who adopted use of the RG features reduced their expenditures as compared to the No-RG Players.

- **RG use differed by risk for gambling problems.**

  Although Problem Gamblers were just as likely to have adopted use of the '*Live Action*' feature as those players identified at lower levels of risk (≈48%), the Problem Gamblers tended to use it 3-4 times more often during play and referred to the other RG features less often in comparison to use by other players. '*Live Action*' is an RG feature that provides information on the current session of play only. Players in the other segments more often accessed the '*My Account*' feature that summarizes play outcomes over time.

- **Impact of RG use differed by risk for gambling problems, although there was no evidence of increased expenditure for either group.**

  Lower-Risk Players who adopted use of the RG features had higher wagering activity and longer play sessions but no change in the amount spent or frequency of play. Higher-Risk Players who adopted RG use also had increased wagering activity, longer play sessions, increased cash-out, and higher winnings but, on average, significantly reduced the amount lost each session of play. Reductions in the amount spent and increased play value were not observed among those players who did not adopt use of the RG features. However, lower per-session expenditures among Higher-Risk Players using the RG features appeared to be offset by an increase in their frequency of play producing no net change in accumulated losses.

  The following table highlights differences on the three key measures (e.g. session *length, per session expenditure and frequency of play*) for total players as well as for those segmented into lower and higher-risk player groups.

	All Players (n=369)		Lower-Risk Players (n=230)		Higher-Risk Player (n=139)	
	No-RG Players (Control Group) (n=247)	RG Adopters (Experimental Group) (n=122)	No-RG Players (Control Group) (n=157)	RG Adopters (Experimental Group) (n=73)	No-RG Players (Control Group) (n=90)	RG Adopters (Experimental Group) (n=49)
Average Play Length per Session	**No Change**	✶✶✶**Change ↑** *(95% CI, p<.05)*	**No Change**	✶✶✶**Change ↑** *(95% CI, p<.05)*	**No Change**	No Change
	Pre: 78 minutes	**Pre:** 82 minutes	**Pre:** 67 minutes	**Pre:** 74 minutes	**Pre:** 93 minutes	Pre: **93 minutes**
	Post: 77 minutes	**Post:** 98 minutes	**Post:** 68 minutes	**Post:** 94 minutes	**Post:** 99 minutes	Post: **104 minutes**
Average Spend per Session	✶✶✶**Change ↑** *(95% CI, p<.05)*	✶✶✶**Change ↓** *(95% CI, p<.05)*	✶✶**Change ↑** *(90% CI, p=.065)*	**No Change**	**No Change**	✶ Change ↓ ***(83% CI, p=.169)***
	Pre: $40.30	**Pre:** $47.00	**Pre:** $31.36	**Pre:** $37.95	**Pre:** $69.32	Pre: **$60.49**
	Post: $52.69	**Post:** $39.82	**Post:** $43.16	**Post:** $36.93	**Post:** $55.89	Post: **$44.14**
Frequency of Play per Month	**No Change**	**No Change**	**No Change**	**No Change**	**No Change**	No Change ***(p=.332)***
	Pre: 3.2 times/mon.	**Pre:** 9.3 times /mon.	**Pre:** 3.3 times /mon.	**Pre:** 8.8 times /mon.	**Pre:** 2.9 times /mon.	Pre: **5.8 times /mon.**
	Post: **3.1times/mon.**	Post: **9.3 times/mon**	Post: **3.2 times/mon**	Post: **10 times/mon**	Post: **3.1 times/mon**	Post: **8.6 times/mon**

4.2 Conclusions

1. Players accepted the card based system for VLTs.

There was high trial and use of the RG features among players, especially regular players who accounted for about 94% of revenues during the field test. The majority (71%) of regular players tried at least one of the features. There was no negative behavioral impact detected in relation to the RG System for those who used the features or for those who chose not to use the features. The findings indicated that the system had had minimal impact for those who did not decide to use any of the voluntary features insofar as there were no reductions or significant changes in play behaviors (e.g. session length, frequency of play) observed among those who did not try any of the features, with the exception that expenditure increased for this group over the course of the trial.

2. The RGD system provided on-going value to a significant proportion of regular players.

About half of all regular players continued to use any RG features after trial. This represented a 65% continued adoption rate, suggesting that these most frequent players were deriving ongoing benefit from using the system.

3. Use of the features was associated with increased play value (e.g. longer play sessions, higher cash-outs, and more winning sessions) and decreased losses.

RG users experienced increased winnings, greater cash-out, longer play sessions, in general, getting greater play value for the money spent. At the same time, use of the RG features was found to have a significant effect in reducing the amount spent especially for use of the information features 'Live Action', 'My Account Year', as well as for use of any control features that allowed players to set limits for play.

4. There was a positive impact detected for lower-risk and Moderate Risk players that was consistent with NSGC's objective to assist players to make more informed decisions about their gambling.

When using the RG System, players, especially those identified at lower to moderate levels of risk, were more likely to have session behaviors and outcomes consistent with NSGC's responsible gaming objectives. The results suggested that the features were assisting players in making decisions that resulted in greater play efficiency and increased entertainment value (e.g. *playing longer for the same or less amount of money*). There were greater returns to the player detected (e.g. *more time and higher winnings*) as well as evidence of more positive play experiences (e.g. *more play sessions ending in a cash- positive or' winning' outcome, reduced expenditure*). There was also evidence of feature impact for purposes of control as well as reduction. For example, among lower-risk players use of the RG features was associated with increased play value for the same amount of expenditure (e.g. *longer, sessions, higher winnings, increased cash-out and no change in expenditure*). In contrast among those lower-risk players who did not use the RG features an increase in expenditures was observed with no associated change or improvements in other game outcomes such as session length, cash-out or winnings. This suggests that the RG features provided assistance to lower-risk is achieving better outcomes for the same amount of money.

5. There were no significant negative RG impacts detected by risk for problem gambling, although Problem Gamblers appeared to respond to and to use the features differently, on average, using reductions in the amount spent per session to play more often.

While Problem Gamblers were not originally considered a key target group for the RGD concept it was still important to undertake analysis to assess any potential impact of the RG system by risk for gambling problems. Those identified as Problem Gamblers were among the heaviest users of the RG system as compared to any other player group. Although there were no significant impacts detected for Problem Gamblers there was evidence that interaction with the RG system produced increased wagering activity and

reduced out-of-pocket expenditure on a per session basis; enhancing the entertainment value of the games for reduced cost. In particular, the ability to check on session information (e.g. 'Live Action' wins/losses) during play appeared to aid the Problem/Gambler in staying on budget, reducing the amount spent or at the very least in playing more efficiently. However, reductions in per session expenditures were offset by increased frequency in play, meaning that higher-risk players were still spending at similar levels overall. While this may reflect a temporary stimulation of player response, the preliminary evidence suggests that, due to differences in how Problem Gamblers interact with the features/games, on-going behaviors should be monitored.

4.3 Recommendations

Recommendation One

Introduce a player tracking system for the multi-channel video lottery program in Nova Scotia with mandatory registration, voluntary access to the various RG features and appropriate safeguards to monitor impact on a continuous basis.

It is challenging, using traditional research methods, to generate survey data that has sufficient precision to detect impact and change. As a result, it is often costly and difficult for gaming managers to obtain timely, conclusive research and information to meet the rigor of evidence-based decision requirements. The availability of a player card or tracking system offers a new, highly effective means of managing and informing the decision process not only for players but also for gaming operators, management, and regulators. The impact and application of the RG System is consistent with the responsible gaming objectives set by NSGC, as well as, NSGC's commitment to empower players by providing accurate play information and management tools. The system itself provides the means to monitor RG impact, in addition to system performance for immediate remedial attention. Mandatory player registration is required for the system to be functionally effective (e.g. *able to undertake player tracking*). However, use of the RG features should remain voluntary until the impact of use has been more thoroughly

assessed among the broader player base. Only voluntary use of the system was tested in the current trial. There were no negative impacts detected among those who chose not to use the system. Moreover, there is evidence that the system offered different benefits and value to different players depending upon their playing styles and needs. It is unclear, at this time, whether mandatory use would be uniformly beneficial although this option can be explored once baselines are established for comparative purposes.

Recommendation Two

Incorporate a program communication and stakeholder education strategy to promote and support use of the RG features as play management and information tools (e.g. *'informed choice', 'play limits', 'self-exclusion'*), especially among higher-risk players.

Although mandatory use of the features is not supported in the current study, there was evidence that players were deriving benefit from using the features on voluntary basis. For many Players, simply having to '*try*' the features (e.g. *acting on a voluntary basis*) appeared to be a barrier to use. About 28% of the regular players exposed to features did not even explore the options offered by the system on a trial basis. It may be that some Players were intimidated by the technology, reluctant to waste resources in learning how the system worked, were skeptical and/or suspicious of the benefits of the features or they may have felt that they did not need any assistance in managing their play. Whatever the case, once players tried the features they were quick to adopt regular use and immediately started to derive value from the system. The rate of up-take was even higher among the test-panel members who were supported throughout the trial process. Therefore, education and awareness of the system is critical for effective use and positive player impact. The features that are specifically designed for those seeking to reduce or eliminate play also offer potential tools to treatment providers and support services in assisting clients to meet play management or abstinence goals. The system also offers opportunities for instituting

and evaluating prevention initiatives including assessment of voluntary versus mandatory use of the RG features.

Recommendation Three

In addition to the current, voluntary RG features, consider using player tracking system to implement the capacity for an involuntary 'safety-net' that will proactively alert players to risk factors or changes in risk associated with their play patterns.

Given that there is evidence that the feedback system itself can heighten the entertainment value of the games, there are strong reasons for ensuring that the system has the capacity for proactively monitoring and identifying potential player risk and changes in that risk due to interaction with the games. This is akin to providing players with an 'airbag' (an involuntary safety feature that is activated under high-risk situations to enhance customer protection) in addition to the voluntary 'seatbelt' features that players can choose to use to control or manage risk. Essentially, the behavioral data can be used to trigger system alerts to apprise the player of increasing risk and to link such alerts to appropriate and relevant information/referral resources (e.g. budgeting information, use of control features such as 'My Money Limit', counseling, self-exclusion). Additionally, other models can be designed to ensure that management is alerted when other abnormal behavior occurs (e.g. cheating, money laundering). From a player perspective, the provision of such an involuntary alert system ensures that players are provided with critical information and feedback to support and foster responsible gambling decisions. This system also assists operators in managing risk, currently and in the future.

Recommendation Four

After implementing the player tracking system, gather baseline information on player behaviours (e.g. *establish benchmarks*) before activating certain RG features such as 'Live Action', in order to confirm the impact of such feature use among the various player groups.

The results of the current research suggest a number of areas where additional information would be valuable in evaluating system impacts. Due to the differential response of Problem Gamblers to the 'Live Action' feature, it would be helpful to obtain baseline measures of player behavior before this specific RG feature is activated in order to fully model and assess the impact of features for higher-risk players. This would identify the normal playing patterns for the Problem Gambler in order to determine how the use of the 'Live Action' RG feature influences those behaviors.

Recommendation Five

Continue to conduct additional research to explore player behavior and response to the system in order to inform and support VLT program management and the process for province–wide implementation.

The player database is an important and unique source of player information that should continued to be mined to gain additional insight about how Players interact with the machines. It is possible to use the database to explore the behavioral impact of various game features, policy, practices, and outcomes. Additional analysis will be helpful in informing on-going responsible gambling research and development. Specifically, additional analysis exploring use of 'Live Action' or other issues related to province-wide implementation are advised in order to inform the process.