Rational Addiction and Massively Multiplayer Games:

A case study of World of Warcraft

By Nicholas Hunter

Introduction

Video games have been receiving a negative public image for, among various other reasons, their "addictive" qualities. It is a cliché of the 20th and 21st centuries to brand nascent media forms as the "downfall of modern society," so why give it a second thought? What's particularly interesting in the case of the discourse surrounding video games is that the consumers under scrutiny, gamers, will often freely admit their "addiction" to games. Particularly, Massively Multiplayer Online Roleplaying Games (MMORPG, or MMO) have received the dubious moniker, within the gaming community, of being a hardcore drug.[1] Given the concerns of society and the purported addictive nature of MMOs, it is an appealing candidate for study.

This paper attempts to determine whether World of Warcraft, an acclaimed and relatively new MMO, is addictive to its players, and if so, what breed of addiction it engenders. Rational Addiction theory as developed by Stigler and Becker (1977) and Becker and Murphy (1988) provide theoretical tools to test these hypotheses. The dataset used in this paper restricts the scope of all conclusions to concern the behaviors of World of Warcraft players. Ultimately, there are indications that World of Warcraft players are experiencing addiction, but the data is inconclusive as to whether it is beneficial or harmful. A more ideal research plan will also be proposed in the process of discussing methods and results.

Theoretical Models

Rational Addiction Model

Chaloupka (1991) does a good job of summarizing the mathematics and theory behind B&M (1988), so the reader is referred to that for a more comprehensive coverage

[1] For example, one of the progenitors of the genre, EverQuest, has maintained the nickname "EverCrack" for most of its 6 year history. Also, it is not uncommon to hear new releases to be referred to as a new form of "crack."

of the topic. The basic assumptions and formulae underlying the rational addiction model are presented here.

Put simply, if consuming a good in the past increases how much of that good you consume in the future, we say that the good is addictive. Once it is established that a good is addictive, we look at the long-run elasticity of demand in order to determine what kind of addiction the user is experiencing, either Negative or Beneficial. In economic terms, cocaine and tobacco are classic examples of negatively addictive products, not because of the negative health effects that one receives from consuming them,[2] but rather, because of the addict's high resistance to price shocks resulting from an inelastic demand curve for the product. As S&B (1977) emphasizes, the inelasticity of the demand curve is responsible for the negative nature of the addiction, and not the other way around.

On the other hand, music appreciation is demonstrative of Beneficial Addiction.[3] The more good music a person listens to, the more good music they want to listen to. Unlike negatively addictive products though, beneficially addictive goods have a high elasticity of demand, and are thus very sensitive to price shocks.   If, for example, the price of opera tickets were doubled, and opera consumption is a beneficially addictive good to opera fans, then we would expect that, despite their fandom, the number of operas viewed by the opera fans would fall to less than 50% of the previous number of operas viewed.

Thus, "Negative Addiction" is simply an addictive good whose consumption is resistant to changes in price, and "Beneficial Addiction" is an addictive good whose consumption is very sensitive to price.

In the Rational Addiction model, the consumer's instantaneous utility function takes the form:

$$U(t) = U[C(t), A(t), Y(t)] \quad (1)$$

where $C(t)$ is consumption of the good in question at time *t*, $Y(t)$ is the consumption of all other goods at time *t*, and $A(t)$ is the addictive stock[4] related to the good in question

[2] Although it does play a part in determining utility valuations
[3] This example is borrowed from B&M (1988)
[4] Becker and Murphy (1988) refers to the addictive stock as "consumption capital"

that has been developed up until time *t*. The dynamics of the utility function are as follows:

$$\frac{\partial U(t)}{\partial C(t)} > 0 \quad (2)$$

$$\frac{\partial U(t)}{\partial A(t)} < 0 \quad (3)$$

$$\frac{\partial U(t)}{\partial Y(t)} > 0 \quad (4)$$

$$\frac{\partial^2 U(t)}{\partial C(t) \partial A(t)} > 0 \quad (5)$$

$$\frac{\partial^2 U(t)}{\partial^2 i(t)} < 0 \quad i(t) = C(t), A(t), Y(t) \quad (6)$$

As Chaloupka (1991) states, Equations (2), (3), and (5) illustrate three key properties of addictive goods. Equation (2) describes withdrawal from a good, as reducing consumption of the good in question reduces the consumer's overall utility. Equation (3) describes tolerance; *ceteris paribus*, greater cumulative past consumption lowers current utility. Equation (5) describes reinforcement; the marginal utility of current consumption is larger as past consumption is greater.

Prior to any consumption of the good in question, $A(t) = 0$. $A(t)$ develops in the following manner:

$$A(t)' = C(t) - \delta A(t) \quad (7)$$

where δ is the depreciation rate of the addictive stock.[5]

Rational addiction implies that addicts will attempt to maximize their lifetime utility function. Assuming a time-additive utility function,[6] a constant rate of time preference, σ, and an infinite lifetime, the lifetime utility function takes the form:

$$U(t) = \int_0^\infty e^{-\sigma t} U[C(t), A(t), Y(t)] dt \quad (8)$$

[5] Chaloupka (1991), pg. 727
[6] So that utility is separable over time in C, A, and Y

Chaloupka (1991) then develops the full price for consuming an addictive good by ignoring the allocation of time over the life cycle, setting $P_Y(t) = 1$, and perfect capital markets. The full price is then:

$$\pi_C(t) = P_C(t)e^{-(\sigma-r)t} - \int_t^{\infty} e^{-(\sigma+\delta)(\tau-t)} U_A(\tau) d\tau \quad (9)$$

Since U_A[7] is always negative, the full price, $\pi_C(t)$, is always greater than the instantaneous cost, $P_C(t)$. So as the addiction stock of the good in question rises, the full price of consuming the good in question also rises. Equilibrium is expected to form as the full price of consuming a good rises until the good becomes too expensive to continue to increase consumption levels. If the depreciation rate of the addictive stock increases, then the shadow price created by the addictive stock falls, increasing overall consumption. Also, if the rate of time preference increases, then the full price falls, raising the equilibrium level of consumption.[8]

Massively Multiplayer Online Games

There are some concepts specific to the MMO genre of games that should be defined so that people unfamiliar with the genre or with games in general, will have a better understanding of the systems and experiences discussed.

MMOs are virtual worlds that continue to exist even while a player is not playing the game. Generally speaking, several thousand players will be playing in the virtual world at any given point in time. The state of a world at any given point in time is defined by what players are in the world, and what action they are undertaking.

- Player Character (PC): The in-game representation of a player. PCs generally have a complex set of statistics that govern how they can interact with the world.
- Character Level: A character's level is a measure of the power that the character possesses, and is, to some extent, a proxy for how much time a player has invested in a PC. In WoW, the maximum level a PC can currently have is 60.

[7] $U_A = \frac{\partial U(t)}{\partial A(t)}$

[8] Chaloupka (1991), pg. 728

- Communication Channels: Players can communicate with one another using text chat similar to an Instant Messenger. While there is some filtering that can go on, the basic kinds of communication are Private, Public, and Broadcast. Private communications are only visible to the person that sends the message and the person that is was sent to. Public communications are visible to the person that sends the message and anyone that is within close physical proximity within the geography of the game world. Broadcast communications are visible to anyone that is listening to the "channel" that the message is broadcasted to.[9]

As a player progresses through the game by increasing the level of their character, or "leveling up," the fundamental experiences involved in play do not change drastically. What does change is the amount of time that the game requires of players in order to achieve particular measures of success. For example, to go from level 1 to level 2, it requires 1-2 hours on average. To go from level 59 to level 60, it can require upwards of 24 hours of play. So while the nature of the product does not drastically change from initial consumption, the reward structure shifts so that it requires players to progressively invest more time in order to maintain their prior levels of rewards received from the game. The general consensus is that this kind of reward structure encourages increasing length of play, which would make it an addictive property.

It should be noted that there is no end condition for MMOs. Players are free to inhabit the virtual world so long as they continue to pay their monthly fee. In fact, much of the new content added to the game revolves around giving new content to those who have achieved the pinnacle of the game's level system.

Methods

This paper uses a modified version of the applied model Chaloupka (1991) developed to estimate the elasticity of demand for the consumption of World of Warcraft playtime, C_{WoW}, measured in units of time.

The models that Chaloupka (1991) offers are as follows:

[9] For example, a person that is the member of a social organization called a guild can send a message to the guild's chat channel. Any member of the guild, no matter where they are in the game world, will receive the message.

$$C_t = \beta_0 + \beta_1 P_C(t) + \beta_2 P_C(t-1) + \beta_3 P_C(t+1) + \beta_4 C(t-1) + \beta_5 C(t+1) \quad (10)$$

and

$$C_t = \Phi_0 + \Phi_1 P_C(t) + \Phi_2 P_C(t+1) + \Phi_3 C(t+1) + \Phi_4 A(t) \quad (11)$$ [10]

Equations (10) and (11) represent the instantaneous demand for C. It is easier to get data that fits Equation (10), however, the data collection period for this paper was restricted, and so the remainder shall use Equation (11) as the basis for empirical analysis.

The major discrepancy between previous studies and this case study is that the usual monetary price for our good C_{WoW} is fixed at a monthly rate. So, if we take the usual assumption that price is the monetary cost per unit of consumption, $P_{WoW,\,t}$ is then inversely proportional to $C_{WoW,\,t}$, as an increase in $C_{WoW,\,t}$ from any positive quantity incurs no additional monetary cost.

This is not a problem that solely relates to the consumption of WoW, or even games in general. Let's take a step back and look at the consumption patterns of media products. The monetary price that one pays to gain access to the product is by all means the first step in the decision making process for consumption. However, once one has access to the good, a second process of valuation begins to occur: "how long will I consume the product for?" The utility of the specific activity in its simplest form is presumably of the form:

$$U(Activity) = \int_0^{Completion} U(I_X(t))dt \quad (12)$$

where $U(Activity)$ is equal to the total utility received from consuming the entertainment product, $I_X(t)$ is the intensity of entertainment that is delivered at the instantaneous point in time t.

Now let's take a brief look at the decision process behind deciding to "put down" an activity and start up another one. The general form of the equation, taken from marginal decision making theory, would be:

$$\frac{\int_0^{Completion} E[U(I_Y(t))]dt}{P_Y(t)} > \frac{\int_{Current}^{Completion} E[U(I_X(t))]dt}{P_X(t)} \quad (13)$$

[10] Chaloupka, 1991, pg. 729

So if a consumer expects that they will get more marginal utility per cost out of starting to consume a new entertainment product than finishing the one that they're currently consuming, they will switch products. However, how do we describe the price of finishing product *X*, $P_X(t)$ If rigid definitions of monetary price are maintained, then technically $P_X(t)$ is zero, in which case there are no expectations that people would switch entertainment products midway, unless $P_Y(t)$ also happens to be 0.

And yet this switching behavior is not an infrequent occurrence. It seems likely that somebody has stopped consuming a book, TV, or game in deference to doing some other activity. If the opportunity cost of continuing to consume the entertainment good is not accounted for in the price of continued consumption, then the model of marginal decision making seem to fall apart when looking at an individual's consumption patterns.[11]

Traditional economics does offer a method for evaluating the opportunity cost of a good. At the margin, the cost of non-productive time is the person's wage rate. This will be one of the models used to evaluate the price of playing, namely:

$$P_{X,t} = w_t \quad (14)$$

where w_t is the person's wage rate for that period of time. Overall utility levels are maintained when trading between activities when time is evaluated in this manner.

The wage rate method of time valuation solves the problem of having $P_X(t)$ equal zero, but it seems to best describe evaluating opportunity cost of other activities versus work. $P_X = w$ and $P_Y = w + \frac{P_{Y,i}}{t}$ [12] solves the problem of having infinite marginal value in Equation (13), at which point, any relative valuations of activities are captured in the utility function in the numerator. However, Equation (11) requires that we have a single price statistic for each period; as stated before, the wage rate model does not seem to sufficiently capture the valuation of playing WoW versus all other activities. For this

[11] To explain a person returning to a product they put down, it is simply a matter that the marginal utility per cost of all other activities has sunk below that of the product that's being returned to.

[12] $\frac{P_{Y,i}}{t}$ *is the initial purchase cost for obtaining access to Good Y*

reason, an approach to develop a relative value of time spent playing WoW versus other as an estimate of the opportunity cost for playing WoW is proposed.

Assumptions for the Time Valuation Model

The motivation for this model is to attempt to develop a metric for the opportunity cost of changing the allocation of time given to a particular activity, without directly observing the monetary repercussions of changing said allocation. The opportunity cost of a given activity is assumed to be the net-utility given up by making a change in a consumer's allocation of time.

First, this model withdraws the usual assumption that the consumer is efficient and always finds their optimal indifference curve. This is not to say that the consumer is not rational and does not attempt to maximize their utility, but rather, that they are often unable to find their optimal indifference curve because of shifting valuations and information asymmetry. Thus, when a person makes a behavior shift, they will likely also shift the indifference curve that they occupy.[13] The consumer's utility function takes the form:

$$U(t) = U[A1(t), A2(t), ..., An(t)] \quad (15)$$

and the indifference curve for any particular activity is the partial derivative of (15) with respect to the consumption of the activity in question. The partial derivative of the indifference curve for *Activity j*,

$$U_{jk}(t) = \frac{\partial^2 U(t)}{\partial Aj(t) \partial Ak(t)} \quad (16)$$

is of particular importance because it describes the relationship of *Activities j* and *k*. If $U_{jk}(t)$ is positive, the two activities are complementary. If $U_{jk}(t)$ is negative, the two activities are substitutes.

Second, the currency in question is time, and the consumption good is the allocation of that time. This has two useful properties:

[13]This may invalidate some of the assumptions made to obtain Chaloupka's shadow price in Equation (9), namely, the ignoring of the allocation of time over the lifetime. Suggestions for how to resolve this logic problem are welcomed.

Time Property 1: It is a zero-sum system; a change in one variable is reflected in an equal and opposite net change dispersed throughout all other variables

$$T = \sum Ai(t) \quad (17)$$

Time Property 2: All sample members are equally wealthy; everyone has the same amount of time to allocate

Time Property 1 suggests that any positive change in one variable should precipitate a negative change in another variable. *Ceteris paribus,* the effect of a change in the allocation of time for one activity on another activity should demand a direct trade off between the two activities. The budget for any given activity is then:

$$A_{Observed} = T - \sum Ai(t) \quad (18)$$

where the partial derivative of Equation (18) with respect to any activity should be equal to -1.

The interactions of the indifference curves from Equation (16) and the budget constraint of Equation (18) are significant. If a positive change in one variable affects a positive change in another variable, then it simply means that a greater negative change must happen elsewhere in the system in order to accommodate the greater overall positive change. Thus, we will be able to accept positive relationships between various activities so long as there is at least one negative relationship among all of the relationships between a particular activity and every other activity.

Time Property 2 benefits the empirical application of the model, as it states that all sample members possess the same amount of the currency, which makes sample members more relatable, even if demographic factors are disparate.

Regression Model

Using the following matrix of regressions, we determine a relationship between $C_{WoW,t}$ and our basket of other observed activities.[14]

$$ActivityA = \beta_0 + \beta_{WoW,ActivityA,t} C_{WoW,t} + \sum \beta_{ActivityB,ActivityA,t} ActivityB_t \quad (19)$$

[14] See Appendix I for more details

where *Activity A* is the activity in question, and *ActivityB* is all other activities. The matrix of regressions is developed by running the regression of Equation (19) for each of the activities in the basket as *ActivityA.*

$$Work_t = \beta_0 + \beta_{WoW,Wor,t} C_{WoW,t} + \beta_{Other,Work,t} Other_{tt} + \beta_{Sleep,Work,t} Sleep_t + \beta_{Eat,Work,t} Eat_t + \beta_{Hygiene,Work,t} Hygiene_t$$
(20)

Equation (20) is the application of Equation (19) to *Work* for this study. See Equations (A2) through (A6) in the Appendix I for the full list. The βs are interpreted as follows:

β_0 is the base amount of time the consumer expects to allocate to an activity

$$\beta_{ActivityB,ActivityA,t} = \frac{\Delta ActivityA_t}{\Delta ActivityB_t} \quad (21)$$

Equation (21) states that for a unit increase in *ActivityB*, the amount of *ActivityA* performed will change by $\beta_{ActivityB,ActivityA,t}$.[15] $\Delta ActivityB$ is interpreted as a change in the allocation of time, our consumption good, and $\Delta ActivityA_t$ is the cost incurred on *ActivityA* for making that allocation. If there is no preference in which activity time is drawn from to accommodate an increase in an activity, we would expect all the βs to be the equal. As later empirical analysis will show though, this is not the case. The sign of $\Delta ActivityA_t$ will be determined by the relationship between the *ActivityA* and *ActivityB.* If the *ActivityA* and *ActivityB* are substitutes, then $\Delta ActivityA_t$ and $\Delta ActivityB$ should have opposite signs. If the two are complementary, then $\Delta ActivityA_t$ and $\Delta ActivityB$ should have the same signs. While at first thought it may seem unlikely for $\Delta ActivityA_t$ and $\Delta ActivityB$ to be the same sign, remember that *Time Property 1* merely requires that the **net**-change in the overall system be opposite and equal to $\Delta ActivityB$.[16]

$$P_{ActivityB,ActivityA}(t) = -\beta_{ActivityB,ActivityA,t} \quad (22)$$

Equation (22) is interpreted as the price per unit of consumption of. *ActivityB* with respect to *ActivityA*. The negative sign has been inserted in order to preserve the concept

[15] $\beta_{ActivityB,ActivityA,t}$ is representative of the combined effects of the partial derivative of the indifference curve for *ActivityB* with respect to *Activity A* and the partial derivative of the budget constraint for *ActivityB* with respect to *ActivityA*

[16] In the Appendix, see Proposal for Time Valuation Equilibrium Model for a slightly more detailed discussion of the thought process behind how net-changes are balanced

that higher prices are more expensive, as is required for the dynamics of Equation (11) to behave properly.

Next, the total price of an activity is found in the sum the price of each activity relative to all other reported activities. C*eteris paribus* is preserved, as only the change in one variable from each regression, *ActivityB*, is under inspection when totaling the price.

$$\mathrm{P}_{\mathrm{ActivityB}}(t) = \sum P_{\mathrm{ActivityB,ActivityAi}}(t) \quad (23)$$

$\mathrm{P}_{\mathrm{WoW}}(t)$ describes the relationship between playing WoW and all other activities. *Time Property 1* suggests that $\mathrm{P}_{\mathrm{WoW}}(t)$ should be equal to positive unity in order to preserve the zero-sum system. If we find that $\mathrm{P}_{\mathrm{WoW}}(t) \neq 1$, then one of two things is happening. One possibility is that the set of observed activities was not comprehensive enough. This can be checked fairly easily by comparing the average time reported by sample members to the absolute time available for the period under examination.[17] The other possibility is that the valuations of all other activities compared to WoW are not balanced as a perfect substitute for $C_{WoW,t}$.[18] In this case, the valuation of playing WoW is not in equilibrium with the all other activities. $\mathrm{P}_{\mathrm{WoW}}(t) < 1$ suggests that utility would be increased by consuming more WoW.[19] $\mathrm{P}_{\mathrm{WoW}}(t) > 1$ suggests that utility would be decreased by consuming more WoW.[20] $\mathrm{P}_{\mathrm{WoW}}(t)$ becomes an indicator of the valuation of playing WoW versus all other observed activities. If $\mathrm{P}_{\mathrm{WoW}}(t)$ is not positive, then the basket of activities has likely omitted a significant substitute activity that is important to the sample under investigation.[21]

The regression model to determine addiction, drawn from Equation (11), is as follows:

---

[17] For example, if sample members report on average 160 of the 168 (95%) hours in a week, then basket comprehensiveness is less likely to be a problem than if they only report on average 84 of the 168 (50%) hours in a week. The latter suggests that some major activities were excluded from survey.

[18] i.e. increase the consumption of WoW by subtracting $P_{\mathrm{WoW,Activity}}(t)\dfrac{A_t}{T_t}$ from each of the activities,

[19] i.e. In our weighted average, in general $\left|\Delta Activity_t\right| < \left|\Delta C_{WoW,t}\right|$

[20] i.e. In our weighted average, in general $\left|\Delta Activity_t\right| > \left|\Delta C_{WoW,t}\right|$

[21] A negative price essentially suggests that WoW is generally complementary to all other activities, which would result in consuming more

$$C_{WoW,t} = \beta_0 + \beta_1 P_{WoW}(t) + \beta_2 P_{WoW}(t+1) + \beta_3 C_{WoW}(t+1) + \beta_4 MMOD(t) \quad (24)$$

where $MMOD(t)$ is the depreciated history of play for all MMOs, including WoW, β_4 is a crude substitute for Φ_4 in (11). For, the wage rate price definition given in (14), we will assume that $\beta_1 = \beta_2$, as data pertaining to wage is drawn from census averages for age and gender; minimal change is expected to appear over the one month interval.

Data

There are no published datasets available to the general community regarding usage statistics of WoW or any other MMO games. The dataset presented in conjunction with this paper was collected by interviewing a randomly selected sample of WoW players spread across 13 different servers. Members of the sample went through an initial interview and a follow up interview approximately a month's time after the initial interview.

Several measures were taken to acquire an independently and identically distributed random sample. First, a server was selected at random. Then, prior to an initial interview, potential sample members were selected by generating two evenly distributed random numbers. The first number, ranging from 1 to 60, was used to determine the level of the PC. The second number, ranging from 1 to 26, was used to determine the first letter of the name of the potential sample member. If, after applying these filters, there were no players that fit these two criteria, then the process would be restarted from the beginning. If there were multiple PCs that fit the criteria, then a third random number, whose range was the number of players meeting the criteria, was generated and used to select one of the candidates (still in alphabetical order). Character levels are not evenly distributed from 1 to 60, but a fair representation of the distribution is expected because the second filter the second filter rejected more often when there were fewer people at any particular level.

After a candidate was selected, they would be contacted over WoW's private communication channel. While there is some variation in the expression, the initial contact message basically was:

> "hi, I'm doing a survey for a class and was wondering if you'd be willing to lend a hand by answering a few quick questions."

If the player agreed,[22] then they would be asked the following series of questions:

1) How many hours a week do you play WoW?
2) Have you previously played an MMO? If so, for how long?
3) How many hours a week do you spend on other leisure activities? (e.g. other games, television, reading, going out, etc.)
4) How many hours per week do you work? (school, job, etc.)
5) How many hours a day do you sleep?
6) How much time a day do you spend eating?
7) How much time a day do you spend showering, brushing your teeth, etc.?
8) Do you regularly consume caffeine, tobacco, or alcohol? If so, how many times per week?
9) Which pricing plan do you use for WoW? (optional)
10) Finally, would you be willing to answer a similar set of questions in a month's time?[23]

These questions were asked using a chat macro that sent the above questions in their exact form to each sample member. The succeeding question was not asked until the previous question had been answered, so that later questions would not influence earlier questions. If data was given as a range, it was input into the dataset as the average of the range.

The follow up interview, approximately a month after the initial interview, required finding a player when they were logged on.[24] When the player became available, they were asked the following set of questions:

1) How many hours a week do you play WoW?
2) How many hours a week do you spend on other leisure activities? (e.g. other games, television, reading, going out, etc.)
3) How many hours per week do you work? (school, job, etc.)
4) How many hours a day do you sleep?
5) How much time a day do you spend eating?
6) How much time a day do you spend showering, brushing your teeth, etc.?
7) What age group are you in? 13-18, 19-22, 23-34, 35-50, 51-64, 64+
8) Gender?

[22] The response rate of subjects was approximately 50%

[23] This question was necessary to avoid violating WoW's End User License Agreement, which only permits one unsolicited communication between a player and any other player.

[24] Logged On/Off: A Player is logged on to a game when they are playing the game. A Player is Logged Off when they are not currently in the game.

9) How many months have you been subscribed to WoW?
10) Do you regularly play WoW with people you know from real life?
11) Do you have any alternate characters? If so, what's your highest level character?
12) Do you believe that you are addicted to WoW? If so, do you think playing WoW has a negative impact on your life?

The follow up interview was conducted in the same manner as the initial interview, so all follow up questions were asked in the same order and language.

Character data that was accessible by using WoW's "/who <charactername>" function, as well as information about the server's population and rule set has also been included. Players on RP servers were not interviewed for this sample, as I viewed it as excessively intrusive for that context, and it also ran a higher risk of my presence being reported as a nuisance to the game's authorities, which could potentially result in a suspension of the privilege to enter WoW.

Income data was taken from the Bureau of Labor Services website, which means all income figures are medians of weekly income from the year 2004. I have adjusted them to reflect the wage rate for a 40 hour work week.

The price data used for the application of the Time Valuation model will break down the sample into two groups based upon age, 13-22 and 23+. The prices are generated by performing the matrix of regressions in Equation (19) separately, and then regressing Equation (24) with the values generated from Equation (23) subbed in appropriately.[25]

Results

S&B (1977) suggests that one can determine whether a good is "beneficially" or "negatively" addictive by examining the long-run elasticity of demand for the good. The elasticity of demand is determined using the following equation:

$$\frac{\partial C^*}{\partial P}\frac{P}{C^*} = \frac{\Phi_1 + \Phi_2}{1 - \Phi_3 - \frac{\Phi_4}{\delta}}\frac{P}{C^*} \quad (25)$$[26]

[25] i.e. all 13-22 year olds will have the same P(0) and P(1), and all 23+ will have the same P(0) and P(1)
[26] Chaloupka (1991), pg. 730

where δ is the percentage of addictive stock that depreciates between periods, P is the price of our good, and C* is the ideal level of consumption for the individual.[27]

Chaloupka (1991) points out that the roots of Equation (25) are useful in describing the dynamics of addictive good consumption, as the good is addictive if and only if both roots are positive.

$$\lambda_1 = \frac{1-(1-4\frac{\Phi_4}{\delta}\Phi_3)}{2\frac{\Phi_4}{\delta}} \text{ and } \lambda_2 = \frac{1+(1-4\frac{\Phi_4}{\delta}\Phi_3)}{2\frac{\Phi_4}{\delta}}$$

The signs of the roots are then dependent on Φ_3, which is positive when a good is addictive. λ_1 , the smaller root, gives us the change in current consumption as the result of a shock to future consumption. The inverse of λ_2, the larger root, gives us the change in current consumption as the result of a shock to past consumption. These shocks would result from any factor affecting consumption of the good in question, including past and future prices.

[27] As a proxy for C* we will be using the sample's semi quartile average. For the price, the overall average wage is used for the Wage Rate Valuation model, and the future price is used to evaluate the Time Valuation model.

Wage Rate Valuation

Independent Variable	$\delta = 80\%$	(N = 30)	$\delta = 60\%$
Price(t)	0.410304		0.423315
	(0.672371)		(0.67497)
Future Consumption	**0.507233**		**0.5063**
	(0.178267)		**(0.180439)**
Addictive Stock	87.12292		9.958262
	(229.424)		(44.33479)
F-statistic	3.29		3.24
Price Elasticity			
- Men 13-22	-0.001999		-0.018704
- Men 23+	-0.003808		-0.03563
- Women 13-22	-0.001875		-0.017544
- Women 23	-0.002995		-0.028018
$\lambda 1$	1.014466		1.0126
$\lambda 2$	-1.005283		-0.932265

Time Valuation Model

Independent Variable	$\delta = 80\%$	(N = 30)	$\delta = 60\%$
Price(t)	N/A		N/A
Price (t +1)	2.785266		2.798715
	(4.645137)		(4.660889)
Future Consumption	**.5122935**		**0.5110483**
	(0.177271)		**(0.179746)**
Addictive Stock	100.1197		12.44165
	(227.384)		(43.91983)
F-statistic	3.28		3.23
Price Elasticity			
- 13-22	0.000399		0.003321
- 23+	-0.001073		-0.008921
$\lambda 1$	1.024587		1.022097
$\lambda 2$	-1.016597		-0.957796

Price Statistics for Time Valuation model

Demographic		Total Price	Other	Work	Sleep	Eat	Hygiene
Age 13-22	Price(0)	0.4723196	-0.0626437	-0.2686033	-0.1223381	-0.107248	0.0885135
(N = 12)	Time Reported: 82.9%		(0.4053249)	(0.4943951)	(0.2889901)	(0.1462293)	(0.1151601)
	Price(1)	-0.338415	0.9718408	-0.7683519	0.1110053	0.0177173	0.0062038
	Time Reported: 85.8%		(0.2592919)	(0.4640115)	(0.4002844)	(0.2490341)	(0.0764118)
Age 23+	Price(0)	0.9481921	-0.2816458	**-0.630822**	0.0311485	-0.0831457	0.0162729
(N = 18)	Time Reported: 83.8%		(0.1915163)	**(0.182814)**	(0.1729044)	(0.078592)	(0.0437196)
	Price(1)	0.9090266	-0.2447218	**-0.5796237**	-0.242586	0.1234737	0.0344312
	Time Reported: 80.4%		(0.1709744)	**(0.1472782)**	(0.1272064)	(0.0895484)	(0.0686362)
Full Sample	Price(0)	1.024373	**-0.3228934**	**-0.6019821**	-0.0345955	-0.0864433	0.0215413
(N = 30)	Time Reported: 83.5%		**(0.1474151)**	**(0.1483851)**	(0.1343857)	(0.0634363)	(0.0420573)
	Price(1)	0.2336089	0.3296063	**-0.5314258**	-0.1187132	0.0766136	0.0103102
	Time Reported: 82.6%		(0.217972)	**(0.1263981)**	(0.1222781)	(0.0713166)	(0.0371631)

The practical effect of the addiction stock seems to dominate calculations of elasticity and lambda. Given its crude formation, negligible statistical significance, and minimal variation, it's hard to accept the results. Meanwhile, the strong statistical significance of future consumption on current consumption suggests that there is in fact an addictive effect taking place. If the Rational Addiction model's interpretation is adhered to then, a negative addiction has been observed. However, Chaloupka's provision that both of the roots must be positive for a good to be addictive is violated; this likely because of the misbehavior of the Addictive Stock.

The reason that the coefficient for current price is not shown is because it exhibited autocorrelation with future price. However, given the extremely small size of the sample, and the fact that only two demographic groups were used to generate the price statistics, this is not very surprising. Also, we see an anomaly with a negative future price for the 13-22 year old group. Again, this is likely a result of the extremely small size of the sample examined (N = 12). See Appendix 2 for the full results of the regressions.

The prices drawn from the full sample indicate a significant, negative relationship between playing WoW and working. Given that the large practical size of the coefficient for work (50%-60%) this supports the usage of the wage rate valuation model as a method of evaluating the opportunity cost for playing WoW, and also perhaps why we get similar values for the coefficient on Future Consumption. However, only accounting for work suggests that 40%+ of the opportunity cost is still unaccounted for, which is why the Time Valuation model warrants more investigation.

Ideal Research Plan

The empirical application of the Rational Addiction model and Time Valuation models presented here are less than desirable, as the former prefers long time series in order to understand trends in behavior and the latter requires a larger sample to break down demographically. Thus the first recommendation is to extend the period of observation beyond the two-period valuation presented in this paper, and develop a cohort whose time management behaviors are tracked on a monthly basis for a 1-2 year period.[28] Preferably, the cohort would be developed at the release of a new MMO, in particular, one that draws in both veterans and new comers.

While there are some benefits afforded by doing in game interviews, in the end, the logistical hassle of tracking down sample members makes it a rather inefficient approach to the data collection process. Other lines of communication, such as email or web form, should be opened with cohort members so they may be contacted as necessary. This is particularly useful in scenarios where a cohort member may have decided to stop playing the game altogether. If the web form option were to chosen, giving subjects the ability to add additional fields for other time consuming activities could be a valuable way to ensure a more comprehensive data set with respect to time activities.

The Rational Addiction model is particularly useful in **identifying** addiction, and then **quantifying** it in the price elasticity. However, it tells us very little **qualitative** information about the addiction. While there are indications in this paper of addiction, neither the Rational Addiction model nor the Time Valuation model grant an understanding of why there is an addiction, least as they are used in this paper.

The desired qualitative information can, however, be inferred if there were a larger sample size and a higher resolution of demographic data. Cross sections could then be broken down by income level, age, membership to in game social institutions, and other demographic factors in order to get more precise valuations of time for each

[28] The size of the cohort and the length of the study are of course up to the researcher, but of course, the more people in the cohort and the longer the period of observation, the more reliable the results.

group of users. Equation (24) could then be regressed using the more diversified price sample. The long-run price elasticity of demand could then be compared from group to group. We can then infer from the demographic groups with more inelastic demand properties of consumers to whom a good is particularly addictive. Given the proper demographic properties, such as the subject's preference particular game systems, what aspects of a game or product are particularly addictive could also be empirically tested.

Conclusion

Unfortunately, the dataset developed for this paper simply was not large enough to properly test the models described herein, particularly, the Time Valuation model. Regardless of the model employed though, there is a strong statistical relationship between consumption across various time periods suggests that there is some form of addiction taking place. However, there simply isn't enough data here to say definitively whether it is beneficial or harmful.

Appendix I

Proposal for Time Valuation Equilibrium Model

The regression model used to determine the relationship between $C_{WoW,t}$ and all other activities is actually a subset of the overall decision making process that I believe is going on. Not only are there relationships in the time valuation of $C_{WoW,t}$ versus all other activities, but we should expect that there such are relationships between **all** activities. Using the regression model used in this paper as an example, we should have a matrix of relationships such that:

$$C_{WoW,t} = \beta_0 + \beta_{Other,t} Other_t + \beta_{Work,t} Work_t + \beta_{Sleep} Sleep_t + \beta_{Eat,t} Eat_t + \beta_{Hygiene,t} Hygiene_t \quad \text{(A1)}$$

$$Other_t = \beta_0 + \beta_{WoW,t} C_{WoW,t} + \beta_{Work,t} Work_t + \beta_{Sleep} Sleep_t + \beta_{Eat,t} Eat_t + \beta_{Hygiene,t} Hygiene_t \quad \text{(A2)}$$

$$Work_t = \beta_0 + \beta_{Other,t} Other_t + \beta_{WoW,t} C_{WoW,t} + \beta_{Sleep} Sleep_t + \beta_{Eat,t} Eat_t + \beta_{Hygiene,t} Hygiene_t \quad \text{(A3)}$$

$$Sleep_t = \beta_0 + \beta_{Other,t} Other_t + \beta_{Work,t} Work_t + \beta_{WoW,t} C_{WoW,t} + \beta_{Eat,t} Eat_t + \beta_{Hygiene,t} Hygiene_t \quad \text{(A4)}$$

$$Eat_t = \beta_0 + \beta_{Other,t} Other_t + \beta_{Work,t} Work_t + \beta_{Sleep} Sleep_t + \beta_{WoW,t} C_{WoW,t} + \beta_{Hygiene,t} Hygiene_t \quad \text{(A5)}$$

$$Hygiene_t = \beta_0 + \beta_{Other,t} Other_t + \beta_{Work,t} Work_t + \beta_{Sleep} Sleep_t + \beta_{Eat,t} Eat_t + \beta_{WoW,t} C_{WoW,t} \quad \text{(A6)}$$

If the model is comprehensive, then a shock to one of the variables should have a ripple effect on all other variables in the model. Eventually, the shock should settle down into an equilibrium determined by the matrix of coefficients. We would then start to explain shifts in general behavior using shifts in the coefficients that moved the equilibrium allocations of time. It is not clear that OLS is the best modeling technique for this kind of analysis; particularly given the possibility that beta could shift relative to the value of its related variable.[29] A successful model will capture the relationships between all activities and allow the possibility for an equilibrium state.

[29] For example, a person would be more willing to give up 10 minutes of eating time if they had 2 hours allocated towards eating when compared to a person that only had 15 minutes allocated to eating

Appendix II

Appendix 2-A: Full Sample Regressions and Wage Rate Regressions
Appendix 2-B: 13-22 Price Regressions
Appendix 2-C: 23+ Price Regressions
Appendix 2-D: Time Valuation Regressions
Appendix 2-E: Dataset

Interpretations of column headers:
If a 0 or 1 appears at the end of a header, it means it is data from the initial or follow up interview, respectively.
Date: Date of Interview
Time: Time of day of interview (military time, East Coast time)
Guilded: Whether the player was in a guild or not
Level: Level of Player
WoWP: How many hours per week spent in WoW
Other: How many hours per week spent on other leisure activities
Work: How many hours per week spent on work, school, etc.
Sleep: How many hours per day spent sleeping
Eat: How many minutes per day spent eating
Hygiene: How many minutes per day spent on showering, brushing teeth, etc.
Tobacco: How much tobacco per week is consumed (generally speaking, number of cigarettes per week)
Alcohol: How many alcoholic beverages are consumed per week
Caffeine: How many caffeinated beverages are consumed per week
PayPlan: What pay plan the player uses; 1 = 1 month, 3 = 3 month, 6 = 6 month, GC = Game Card, N/A = did not know or opted not to respond
OtherMMO: How many months have been spent playing other MMOs
MMOD##: Depreciated value of months. Depreciation rate is ##
Age: Self explanatory
M/F: Male or Female. If Male, then equal to 1. If Female, then equal to 0.
WoWT: How many months the player has been subscribed to WoW
RLFriend: Equal to 1 if the player regularly plays with people s/he knows from real life
Addict: Equal to 1 if the player believes they are addicted to WoW.
Negative: Equal to 1 if the player believes their playing WoW has a negative impact on their life.
OtherChar: Equal to 1 if the player has other characters.
HighLVL: Equal to the highest level of all of the player fs characters
Human: Equal to 1 if the character is Human.
Dwarf: Equal to 1 if the character is Dwarf
Gnome: Equal to 1 if the character is Gnome
NightElf: Equal to 1 if the character is Night Elf
Tauren: Equal to 1 if the character is Tauren
Troll: Equal to 1 if the character is Troll
Undead: Equal to 1 if the character is Undead
Orc: Equal to 1 if the character is Orc
Warrior: Equal to 1 if the character is Warrior
Hunter: Equal to 1 if the character is Hunter
Warlock: Equal to 1 if the character is Warlock
Priest: Equal to 1 if the character is Priest
Mage: Equal to 1 if the character is Mage
Rogue: Equal to 1 if the character is Rogue
Paladin: Equal to 1 if the character is Paladin
Shaman: Equal to 1 if the character is Shaman
Druid: Equal to 1 if the character is Druid
ServerNorm: Equal to 1 if the player fs server is Normal ruleset
ServerPVP: Equal to 1 if the player fs server is PVP ruleset
SeverLow: Equal to 1 if the player fs server has a light load level
SeverMed: Equal to 1 if the player fs server has a medium load level
SeverHigh: Equal to 1 if the player fs server has a high load level

Bibliography

1) George J. Stigler; Gary S. Becker. "De Gustibus Non Est Disputandam." *The American Economic Review*, Vol. 67, No. 2 (March, 1977), pg. 76-90.
2) Gary S. Becker; Kevin M. Murphy. "A Theory of Rational Addiction." *The Journal of Political Economy*, Vol. 96, No. 4, (August, 1988), pg. 675-700.
3) Frank Chaloupka. "Rational Addictive Behavior and Cigarette Smoking." *The Journal of Political Economy*, Vol. 99, No. 4, (August, 1991), pg. 722-744.
4) Bureau of Labor Services, http://www.bls.gov/cps/cpsaat37.pdf

Special Thanks
I’d like to offer my gratitude to Dmitri Williams (U of Illinois), Leo Mizuhara (U of Chicago), and Brendan Moore (Harvard) for their contributions in reviewing the work of this paper. I would also like to thank Professor Michael Greenstone (MIT) and Jessica Cohen (MIT) for allowing me to take on this project in class, and offering their support, understanding, and insight.

Appendix 2-A

Wednesday May 11 19:18:27 2005   Page 1

```
 ___  ____  ____  ____  ____tm
/__    /   ____/   /   ____/
___/   /   /___/   /   /___/
  Statistics/Data Analysis
```

F(5, 24) = 6.11

log: **C:\Documents and Settings\nhunter\Desktop\WoWLog.smcl**
log type: **smcl**
opened on: **11 May 2005, 15:44:47**

1 . regress wowp0 other0 work0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	**4774.4461**	**5**	**954.88922**
Residual	**3752.39557**	**24**	**156.349815**
Total	**8526.84167**	**29**	**294.029023**

Number of obs =	**30**
F(5, 24) =	**6.11**
Prob > F =	**0.0009**
R-squared =	**0.5599**
Adj R-squared =	**0.4683**
Root MSE =	**12.504**

wowp0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other0	**-.5159615**	**.2355592**	**-2.19**	**0.038**	**-1.002132**	**-.0297912**
work0	**-.6757635**	**.1665718**	**-4.06**	**0.000**	**-1.019551**	**-.3319763**
sleep0	**-.0795984**	**.309199**	**-0.26**	**0.799**	**-.7177538**	**.5585569**
eat0	**-.8307665**	**.6096571**	**-1.36**	**0.186**	**-2.089037**	**.4275038**
hygiene0	**.5019455**	**.9799994**	**0.51**	**0.613**	**-1.520674**	**2.524565**
_cons	**65.97157**	**18.49176**	**3.57**	**0.002**	**27.80645**	**104.1367**

2 . regress other0 wowp0 work0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	**1159.18351**	**5**	**231.836702**
Residual	**2348.28315**	**24**	**97.8451314**
Total	**3507.46667**	**29**	**120.947126**

Number of obs =	**30**
F(5, 24) =	**2.37**
Prob > F =	**0.0698**
R-squared =	**0.3305**
Adj R-squared =	**0.1910**
Root MSE =	**9.8917**

other0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
wowp0	**-.3228934**	**.1474151**	**-2.19**	**0.038**	**-.6271431**	**-.0186436**
work0	**-.3813189**	**.1523574**	**-2.50**	**0.020**	**-.6957691**	**-.0668686**
sleep0	**-.1611494**	**.24272**	**-0.66**	**0.513**	**-.6620989**	**.3398002**
eat0	**.5418332**	**.4882271**	**1.11**	**0.278**	**-.465818**	**1.549484**
hygiene0	**.459218**	**.7738277**	**0.59**	**0.558**	**-1.137884**	**2.05632**
_cons	**41.31608**	**16.01103**	**2.58**	**0.016**	**8.270937**	**74.36123**

3 . regress work0 other0 wowp0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	**3558.47496**	**5**	**711.694991**
Residual	**3342.70004**	**24**	**139.279168**
Total	**6901.175**	**29**	**237.971552**

Number of obs =	**30**
F(5, 24) =	**5.11**
Prob > F =	**0.0025**
R-squared =	**0.5156**
Adj R-squared =	**0.4147**
Root MSE =	**11.802**

work0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other0	**-.5427943**	**.2168755**	**-2.50**	**0.020**	**-.9904034**	**-.0951852**
wowp0	**-.6019821**	**.1483851**	**-4.06**	**0.000**	**-.9082338**	**-.2957303**
sleep0	**-.3375598**	**.2839949**	**-1.19**	**0.246**	**-.9236966**	**.248577**
eat0	**.2923947**	**.5942691**	**0.49**	**0.627**	**-.9341165**	**1.518906**
hygiene0	**-.2417065**	**.928686**	**-0.26**	**0.797**	**-2.15842**	**1.675007**
_cons	**75.66915**	**15.08572**	**5.02**	**0.000**	**44.53374**	**106.8046**

Appendix 2-A


```
4 . regress sleep0 work0 other0 wowp0 eat0 hygiene0

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  5,    24) =    1.05
       Model |  355.916686     5  71.1833371           Prob > F      =  0.4132
    Residual |   1630.8863    24  67.9535958           R-squared     =  0.1791
-------------+------------------------------           Adj R-squared =  0.0081
       Total |  1986.80299    29  68.5104478           Root MSE      =  8.2434

------------------------------------------------------------------------------
      sleep0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       work0 |  -.1646937   .1385597    -1.19   0.246    -.4506668    .1212794
      other0 |  -.1119185   .1685694    -0.66   0.513    -.4598287    .2359917
       wowp0 |  -.0345955   .1343857    -0.26   0.799     -.311954     .242763
        eat0 |   .7070585   .3914211     1.81   0.083    -.1007948    1.514912
    hygiene0 |  -.6809608   .6345512    -1.07   0.294     -1.99061    .6286884
       _cons |   53.84107   10.32709     5.21   0.000       32.527    75.15513
------------------------------------------------------------------------------

5 . regress eat0 sleep0 work0 other0 wowp0 hygiene0

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  5,    24) =    2.69
       Model |  218.878011     5  43.7756021           Prob > F      =  0.0456
    Residual |  390.446063    24   16.268586           R-squared     =  0.3592
-------------+------------------------------           Adj R-squared =  0.2257
       Total |  609.324074    29   21.011175           Root MSE      =  4.0334

------------------------------------------------------------------------------
        eat0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      sleep0 |    .169275   .0937091     1.81   0.083     -.024131    .3626809
       work0 |   .0341533    .069414     0.49   0.627      -.10911    .1774167
      other0 |   .0900899   .0811769     1.11   0.278     -.077451    .2576308
       wowp0 |  -.0864433   .0634363    -1.36   0.186    -.2173695    .0444828
    hygiene0 |   .3537445   .3095323     1.14   0.264    -.2850988    .9925877
       _cons |   -2.52273   7.361001    -0.34   0.735    -17.71509    12.66963
------------------------------------------------------------------------------

6 . regress hygiene0 eat0 sleep0 work0 other0 wowp0

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  5,    24) =    0.63
       Model |  21.0943347     5  4.21886694           Prob > F      =  0.6795
    Residual |  161.036511    24  6.70985462           R-squared     =  0.1158
-------------+------------------------------           Adj R-squared = -0.0684
       Total |  182.130846    29  6.28037399           Root MSE      =  2.5903

------------------------------------------------------------------------------
    hygiene0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        eat0 |   .1458992   .1276642     1.14   0.264    -.1175868    .4093853
      sleep0 |  -.0672392   .0626567    -1.07   0.294    -.1965563    .0620778
       work0 |  -.0116444     .04474    -0.26   0.797    -.1039831    .0806944
      other0 |   .0314915   .0530662     0.59   0.558    -.0780318    .1410147
       wowp0 |   .0215413   .0420573     0.51   0.613    -.0652607    .1083433
       _cons |   6.882816   4.525859     1.52   0.141    -2.458099    16.22373
------------------------------------------------------------------------------
```

Appendix 2-A

7 . regress wowp1 other1 work1 sleep1 eat1 hygiene1

Source	SS	df	MS
Model	4781.38556	5	956.277112
Residual	2972.91444	24	123.871435
Total	7754.3	29	267.389655

Number of obs	=	30
F(5, 24)	=	7.72
Prob > F	=	0.0002
R-squared	=	0.6166
Adj R-squared	=	0.5367
Root MSE	=	11.13

wowp1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other1	.2639124	.1745279	1.51	0.144	-.0962955	.6241204
work1	-.7981174	.18983	-4.20	0.000	-1.189907	-.4063275
sleep1	-.3183178	.3278767	-0.97	0.341	-.9950221	.3583865
eat1	.5988475	.5574439	1.07	0.293	-.5516601	1.749355
hygiene1	.3100555	1.1176	0.28	0.784	-1.996557	2.616668
_cons	52.79867	18.33257	2.88	0.008	14.9621	90.63524

8 . regress other1 wowp1 work1 sleep1 eat1 hygiene1

Source	SS	df	MS
Model	2948.55843	5	589.711687
Residual	3712.94157	24	154.705899
Total	6661.5	29	229.706897

Number of obs	=	30
F(5, 24)	=	3.81
Prob > F	=	0.0111
R-squared	=	0.4426
Adj R-squared	=	0.3265
Root MSE	=	12.438

other1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
wowp1	.3296063	.217972	1.51	0.144	-.1202657	.7794784
work1	-.1321521	.278255	-0.47	0.639	-.7064423	.442138
sleep1	.2523414	.3699768	0.68	0.502	-.5112532	1.015936
eat1	.7752546	.6178304	1.25	0.222	-.4998847	2.050394
hygiene1	.7084169	1.242591	0.57	0.574	-1.856165	3.272999
_cons	-4.547577	23.74759	-0.19	0.850	-53.5602	44.46504

9 . regress work1 other1 wowp1 sleep1 eat1 hygiene1

Source	SS	df	MS
Model	3669.85418	5	733.970837
Residual	1979.51248	24	82.4796868
Total	5649.36667	29	194.805747

Number of obs	=	30
F(5, 24)	=	8.90
Prob > F	=	0.0001
R-squared	=	0.6496
Adj R-squared	=	0.5766
Root MSE	=	9.0818

work1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other1	-.0704554	.1483485	-0.47	0.639	-.3766316	.2357209
wowp1	-.5314258	.1263981	-4.20	0.000	-.7922987	-.2705528
sleep1	-.5602347	.2476175	-2.26	0.033	-1.071292	-.0491774
eat1	.7443279	.4401971	1.69	0.104	-.1641943	1.65285
hygiene1	.9288224	.8935242	1.04	0.309	-.915321	2.772966
_cons	64.02157	11.41666	5.61	0.000	40.45874	87.5844

Appendix 2-A

10 . regress sleep1 work1 other1 wowp1 eat1 hygiene1

Source	SS	df	MS
Model	**1016.65846**	**5**	**203.331692**
Residual	**1108.71654**	**24**	**46.1965225**
Total	**2125.375**	**29**	**73.2887931**

Number of obs =	**30**
F(5, 24) =	**4.40**
Prob > F =	**0.0055**
R-squared =	**0.4783**
Adj R-squared =	**0.3697**
Root MSE =	**6.7968**

sleep1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
work1	**-.3137851**	**.1386895**	**-2.26**	**0.033**	**-.6000262**	**-.027544**
other1	**.0753513**	**.1104783**	**0.68**	**0.502**	**-.1526646**	**.3033673**
wowp1	**-.1187132**	**.1222781**	**-0.97**	**0.341**	**-.3710828**	**.1336564**
eat1	**.8600969**	**.3010607**	**2.86**	**0.009**	**.2387382**	**1.481456**
hygiene1	**-.2799356**	**.6812052**	**-0.41**	**0.685**	**-1.685874**	**1.126003**
_cons	**53.50111**	**7.027924**	**7.61**	**0.000**	**38.99619**	**68.00604**

11 . regress eat1 sleep1 work1 other1 wowp1 hygiene1

Source	SS	df	MS
Model	**314.961455**	**5**	**62.992291**
Residual	**380.339927**	**24**	**15.847497**
Total	**695.301382**	**29**	**23.9759097**

Number of obs =	**30**
F(5, 24) =	**3.97**
Prob > F =	**0.0091**
R-squared =	**0.4530**
Adj R-squared =	**0.3390**
Root MSE =	**3.9809**

eat1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sleep1	**.2950521**	**.1032774**	**2.86**	**0.009**	**.081898**	**.5082063**
work1	**.1430138**	**.0845787**	**1.69**	**0.104**	**-.031548**	**.3175756**
other1	**.0794142**	**.0632883**	**1.25**	**0.222**	**-.0512063**	**.2100347**
wowp1	**.0766136**	**.0713166**	**1.07**	**0.293**	**-.0705767**	**.2238038**
hygiene1	**.3822758**	**.3927061**	**0.97**	**0.340**	**-.4282297**	**1.192781**
_cons	**-15.45852**	**6.92099**	**-2.23**	**0.035**	**-29.74274**	**-1.174301**

12 . regress hygiene1 eat1 sleep1 work1 other1 wowp1

Source	SS	df	MS
Model	**17.3268907**	**5**	**3.46537815**
Residual	**98.8571701**	**24**	**4.11904875**
Total	**116.184061**	**29**	**4.00634692**

Number of obs =	**30**
F(5, 24) =	**0.84**
Prob > F =	**0.5338**
R-squared =	**0.1491**
Adj R-squared =	**-0.0281**
Root MSE =	**2.0295**

hygiene1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eat1	**.0993603**	**.1020714**	**0.97**	**0.340**	**-.1113046**	**.3100253**
sleep1	**-.0249601**	**.0607387**	**-0.41**	**0.685**	**-.1503186**	**.1003985**
work1	**.0463855**	**.0446227**	**1.04**	**0.309**	**-.0457113**	**.1384824**
other1	**.0188616**	**.033084**	**0.57**	**0.574**	**-.0494205**	**.0871437**
wowp1	**.0103102**	**.0371631**	**0.28**	**0.784**	**-.0663907**	**.087011**
_cons	**3.239149**	**3.821113**	**0.85**	**0.405**	**-4.647241**	**11.12554**

Appendix 2-A


```
13 . regress  wowp0  wage wowp1  mmod100

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  2,    27) =    5.02
       Model |  2310.40395     2  1155.20198           Prob > F      =  0.0140
    Residual |  6216.43771    27  230.238434           R-squared     =  0.2710
-------------+------------------------------           Adj R-squared =  0.2170
       Total |  8526.84167    29  294.029023           Root MSE      =  15.174

------------------------------------------------------------------------------
       wowp0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        wage |    .447293     .65465     0.68   0.500    -.8959377    1.790524
       wowp1 |   .5130349   .1747731     2.94   0.007       .15443    .8716397
     mmod100 |  (dropped)
       _cons |   6.335401   10.26646     0.62   0.542    -14.72963    27.40043
------------------------------------------------------------------------------

14 . regress  wowp0  wage wowp1  mmod80

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  3,    26) =    3.29
       Model |  2344.69283     3  781.564277           Prob > F      =  0.0365
    Residual |  6182.14884    26  237.774955           R-squared     =  0.2750
-------------+------------------------------           Adj R-squared =  0.1913
       Total |  8526.84167    29  294.029023           Root MSE      =   15.42

------------------------------------------------------------------------------
       wowp0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        wage |   .4103039    .672371     0.61   0.547    -.9717744    1.792382
       wowp1 |   .5072329   .1782665     2.85   0.009     .1408009    .8736649
      mmod80 |   87.12292    229.424     0.38   0.707    -384.4649    558.7107
       _cons |  -101.5225   284.2178    -0.36   0.724    -685.7406    482.6955
------------------------------------------------------------------------------

15 . regress  wowp0  wage wowp1  mmod60

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  3,    26) =    3.24
       Model |  2322.44333     3  774.147777           Prob > F      =  0.0381
    Residual |  6204.39833    26  238.630705           R-squared     =  0.2724
-------------+------------------------------           Adj R-squared =  0.1884
       Total |  8526.84167    29  294.029023           Root MSE      =  15.448

------------------------------------------------------------------------------
       wowp0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        wage |   .4233148   .6749696     0.63   0.536    -.9641051    1.810735
       wowp1 |   .5063002   .1804385     2.81   0.009     .1354036    .8771967
      mmod60 |   9.958262   44.33479     0.22   0.824     -81.1732    101.0897
       _cons |  -9.503227   71.28493    -0.13   0.895    -156.0315    137.0251
------------------------------------------------------------------------------

16 . log off
       log:  C:\Documents and Settings\nhunter\Desktop\WoWLog.smcl
  log type:  smcl
 paused on:  11 May 2005, 15:49:02
-------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------
       log:  C:\Documents and Settings\nhunter\Desktop\WoWLog.smcl
  log type:  smcl
resumed on:  11 May 2005, 15:53:28
```

Appendix 2-A


```
17 . regress  wowp0  price0 price1 wowp1  mmod60

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  2,    27) =    4.78
       Model |  2228.5824      2  1114.2912            Prob > F      =  0.0167
    Residual | 6298.25927     27  233.268862           R-squared     =  0.2614
-------------+------------------------------           Adj R-squared =  0.2066
       Total | 8526.84167     29  294.029023           Root MSE      =  15.273

------------------------------------------------------------------------------
       wowp0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      price0 |  (dropped)
      price1 |  (dropped)
       wowp1 |   .5217493   .1767295     2.95   0.006     .1591303    .8843683
      mmod60 |   14.35587   43.28217     0.33   0.743    -74.45181    103.1636
       _cons |  -10.68925   70.45472    -0.15   0.881    -155.2504    133.8719
------------------------------------------------------------------------------

18 . regress  wowp0  price0 price1 wowp1  mmod80

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  2,    27) =    4.86
       Model | 2256.14875      2  1128.07438           Prob > F      =  0.0158
    Residual | 6270.69291     27  232.247886           R-squared     =  0.2646
-------------+------------------------------           Adj R-squared =  0.2101
       Total | 8526.84167     29  294.029023           Root MSE      =   15.24

------------------------------------------------------------------------------
       wowp0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      price0 |  (dropped)
      price1 |  (dropped)
       wowp1 |   .5238129   .1741241     3.01   0.006     .1665398    .8810861
      mmod80 |   107.4047     224.35     0.48   0.636    -352.9234    567.7328
       _cons |  -120.9782   279.1222    -0.43   0.668    -693.6896    451.7331
------------------------------------------------------------------------------

19 . regress  wowp0  price0 price1 wowp1  mmod100

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  1,    28) =    9.75
       Model | 2202.91997      1  2202.91997           Prob > F      =  0.0041
    Residual |  6323.9217     28  225.854346           R-squared     =  0.2584
-------------+------------------------------           Adj R-squared =  0.2319
       Total | 8526.84167     29  294.029023           Root MSE      =  15.028

------------------------------------------------------------------------------
       wowp0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      price0 |  (dropped)
      price1 |  (dropped)
       wowp1 |    .533001   .1706644     3.12   0.004     .1834109    .8825912
     mmod100 |  (dropped)
       _cons |   12.63024   4.486613     2.82   0.009     3.439835    21.82066
------------------------------------------------------------------------------

20 . log off
       log:  C:\Documents and Settings\nhunter\Desktop\WoWLog.smcl
  log type:  smcl
 paused on:  11 May 2005, 15:55:14
```

Appendix 2-B

Wednesday May 11 19:18:56 2005   Page 1

```
  ___  ____  ____  ____  ____tm
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/
  Statistics/Data Analysis
```

```
      log:  C:\Documents and Settings\nhunter\Desktop\WoWLog13-22.smcl
 log type:  smcl
opened on:  11 May 2005, 17:00:02
```

1 . regress wowp0 other0 work0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	572.562768	5	114.512554
Residual	912.999732	6	152.166622
Total	1485.5625	11	135.051136

Number of obs =	12
F(5, 6) =	0.75
Prob > F =	0.6137
R-squared =	0.3854
Adj R-squared =	-0.1267
Root MSE =	12.336

wowp0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other0	-.0632987	.4095623	-0.15	0.882	-1.065462	.9388643
work0	-.1745643	.3213056	-0.54	0.607	-.9607709	.6116422
sleep0	-.2370625	.5599951	-0.42	0.687	-1.607321	1.133196
eat0	-.7671522	1.045988	-0.73	0.491	-3.326593	1.792289
hygiene0	1.012674	1.317535	0.77	0.471	-2.211219	4.236567
_cons	39.78496	32.84584	1.21	0.271	-40.58593	120.1558

2 . regress other0 wowp0 work0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	150.175637	5	30.0351275
Residual	903.553529	6	150.592255
Total	1053.72917	11	95.7935606

Number of obs =	12
F(5, 6) =	0.20
Prob > F =	0.9512
R-squared =	0.1425
Adj R-squared =	-0.5720
Root MSE =	12.272

other0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
wowp0	-.0626437	.4053249	-0.15	0.882	-1.054438	.9291504
work0	-.2906697	.3051458	-0.95	0.378	-1.037334	.4559951
sleep0	-.0200553	.5652897	-0.04	0.973	-1.403269	1.363159
eat0	.149749	1.084484	0.14	0.895	-2.503888	2.803386
hygiene0	-.4739109	1.360021	-0.35	0.739	-3.801762	2.853941
_cons	35.4158	33.46219	1.06	0.331	-46.46324	117.2948

3 . regress work0 other0 wowp0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	514.578003	5	102.915601
Residual	1404.83866	6	234.139777
Total	1919.41667	11	174.492424

Number of obs =	12
F(5, 6) =	0.44
Prob > F =	0.8075
R-squared =	0.2681
Adj R-squared =	-0.3418
Root MSE =	15.302

work0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other0	-.4519312	.4744385	-0.95	0.378	-1.61284	.7089779
wowp0	-.2686033	.4943951	-0.54	0.607	-1.478344	.9411378
sleep0	.0916546	.7039474	0.13	0.901	-1.630843	1.814152
eat0	-.2687353	1.349954	-0.20	0.849	-3.571954	3.034483
hygiene0	-1.000855	1.663455	-0.60	0.569	-5.071181	3.069472
_cons	52.85714	40.00385	1.32	0.235	-45.02876	150.743

Appendix 2-B

4 . regress sleep0 work0 other0 wowp0 eat0 hygiene0

Source	SS	df	MS
Model	253.875557	5	50.7751115
Residual	471.161096	6	78.5268493
Total	725.036653	11	65.912423

Number of obs =	12
F(5, 6) =	0.65
Prob > F =	0.6755
R-squared =	0.3502
Adj R-squared =	-0.1914
Root MSE =	8.8615

sleep0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
work0	.0307395	.236093	0.13	0.901	-.5469593	.6084384
other0	-.0104579	.2947722	-0.04	0.973	-.7317396	.7108238
wowp0	-.1223381	.2889901	-0.42	0.687	-.8294714	.5847953
eat0	.7766723	.7174238	1.08	0.321	-.9788004	2.532145
hygiene0	-.4447607	.9752232	-0.46	0.664	-2.831046	1.941525
_cons	48.21402	17.47733	2.76	0.033	5.448522	90.97951

5 . regress eat0 sleep0 work0 other0 wowp0 hygiene0

Source	SS	df	MS
Model	61.8688941	5	12.3737788
Residual	127.637472	6	21.272912
Total	189.506366	11	17.2278515

Number of obs =	12
F(5, 6) =	0.58
Prob > F =	0.7157
R-squared =	0.3265
Adj R-squared =	-0.2348
Root MSE =	4.6123

eat0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sleep0	.2104004	.19435	1.08	0.321	-.2651569	.6859577
work0	-.0244161	.1226509	-0.20	0.849	-.3245321	.2756998
other0	.0211538	.153196	0.14	0.895	-.3537034	.396011
wowp0	-.107248	.1462293	-0.73	0.491	-.4650581	.2505622
hygiene0	.0799811	.5152739	0.16	0.882	-1.180849	1.340811
_cons	-1.08405	13.69334	-0.08	0.939	-34.59046	32.42236

6 . regress hygiene0 eat0 sleep0 work0 other0 wowp0

Source	SS	df	MS
Model	32.3768869	5	6.47537738
Residual	79.8013542	6	13.3002257
Total	112.178241	11	10.1980219

Number of obs =	12
F(5, 6) =	0.49
Prob > F =	0.7766
R-squared =	0.2886
Adj R-squared =	-0.3042
Root MSE =	3.6469

hygiene0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eat0	.0500057	.3221589	0.16	0.882	-.7382889	.8383002
sleep0	-.0753299	.1651752	-0.46	0.664	-.4794991	.3288393
work0	-.0568532	.0944919	-0.60	0.569	-.2880666	.1743602
other0	-.0418555	.1201163	-0.35	0.739	-.3357696	.2520585
wowp0	.0885135	.1151601	0.77	0.471	-.193273	.3703
_cons	9.821012	10.06382	0.98	0.367	-14.80426	34.44629

Appendix 2-B

7 . regress wowp1 other1 work1 sleep1 eat1 hygiene1

Source	SS	df	MS
Model	4610.72469	5	922.144938
Residual	408.004476	6	68.0007461
Total	5018.72917	11	456.248106

Number of obs =	12
F(5, 6) =	13.56
Prob > F =	0.0032
R-squared =	0.9187
Adj R-squared =	0.8510
Root MSE =	8.2463

wowp1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other1	.7210206	.1923718	3.75	0.010	.2503037	1.191737
work1	-.4082191	.2465255	-1.66	0.149	-1.011445	.1950071
sleep1	.114005	.4111013	0.28	0.791	-.8919237	1.119934
eat1	.0475733	.6686883	0.07	0.946	-1.588648	1.683795
hygiene1	.1768917	2.17877	0.08	0.938	-5.154367	5.508151
_cons	5.63819	24.95996	0.23	0.829	-55.43663	66.71301

8 . regress other1 wowp1 work1 sleep1 eat1 hygiene1

Source	SS	df	MS
Model	4018.48034	5	803.696068
Residual	549.936327	6	91.6560545
Total	4568.41667	11	415.310606

Number of obs =	12
F(5, 6) =	8.77
Prob > F =	0.0099
R-squared =	0.8796
Adj R-squared =	0.7793
Root MSE =	9.5737

other1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
wowp1	.9718408	.2592919	3.75	0.010	.3373764	1.606305
work1	.1911606	.3365435	0.57	0.591	-.6323315	1.014653
sleep1	.0361778	.4801012	0.08	0.942	-1.138588	1.210943
eat1	.0078149	.7766528	0.01	0.992	-1.892586	1.908216
hygiene1	.7564841	2.511979	0.30	0.773	-5.390106	6.903075
_cons	-2.46422	29.08351	-0.08	0.935	-73.629	68.70056

9 . regress work1 other1 wowp1 sleep1 eat1 hygiene1

Source	SS	df	MS
Model	1650.05193	5	330.010385
Residual	767.948073	6	127.991346
Total	2418	11	219.818182

Number of obs =	12
F(5, 6) =	2.58
Prob > F =	0.1401
R-squared =	0.6824
Adj R-squared =	0.4177
Root MSE =	11.313

work1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other1	.2669426	.4699597	0.57	0.591	-.8830073	1.416892
wowp1	-.7683519	.4640115	-1.66	0.149	-1.903747	.3670434
sleep1	-.0676614	.5669347	-0.12	0.909	-1.454901	1.319578
eat1	-.0812081	.9171846	-0.09	0.932	-2.325478	2.163062
hygiene1	.0261013	2.990753	0.01	0.993	-7.292009	7.344211
_cons	44.96086	29.08044	1.55	0.173	-26.19641	116.1181

Appendix 2-B

10 . regress sleep1 work1 other1 wowp1 eat1 hygiene1

Source	SS	df	MS
Model	**815.480938**	**5**	**163.096188**
Residual	**397.269062**	**6**	**66.2115103**
Total	**1212.75**	**11**	**110.25**

Number of obs =	**12**
F(5, 6) =	**2.46**
Prob > F =	**0.1515**
R-squared =	**0.6724**
Adj R-squared =	**0.3994**
Root MSE =	**8.137**

sleep1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
work1	**-.0350021**	**.2932824**	**-0.12**	**0.909**	**-.7526381**	**.682634**
other1	**.0261345**	**.3468208**	**0.08**	**0.942**	**-.8225054**	**.8747745**
wowp1	**.1110053**	**.4002844**	**0.28**	**0.791**	**-.8684554**	**1.090466**
eat1	**1.072621**	**.493957**	**2.17**	**0.073**	**-.1360484**	**2.28129**
hygiene1	**-1.560945**	**2.054537**	**-0.76**	**0.476**	**-6.588216**	**3.466327**
_cons	**46.80826**	**15.70341**	**2.98**	**0.025**	**8.383402**	**85.23312**

11 . regress eat1 sleep1 work1 other1 wowp1 hygiene1

Source	SS	df	MS
Model	**265.797925**	**5**	**53.159585**
Residual	**151.949762**	**6**	**25.3249603**
Total	**417.747687**	**11**	**37.9770624**

Number of obs =	**12**
F(5, 6) =	**2.10**
Prob > F =	**0.1965**
R-squared =	**0.6363**
Adj R-squared =	**0.3332**
Root MSE =	**5.0324**

eat1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sleep1	**.4102622**	**.1889315**	**2.17**	**0.073**	**-.0520366**	**.872561**
work1	**-.0160682**	**.1814784**	**-0.09**	**0.932**	**-.4601298**	**.4279934**
other1	**.0021593**	**.2145925**	**0.01**	**0.992**	**-.5229296**	**.5272482**
wowp1	**.0177173**	**.2490341**	**0.07**	**0.946**	**-.5916471**	**.6270818**
hygiene1	**.7807634**	**1.291606**	**0.60**	**0.568**	**-2.379682**	**3.941208**
_cons	**-15.38263**	**13.94827**	**-1.10**	**0.312**	**-49.51281**	**18.74756**

12 . regress hygiene1 eat1 sleep1 work1 other1 wowp1

Source	SS	df	MS
Model	**3.4420063**	**5**	**.68840126**
Residual	**14.3091515**	**6**	**2.38485858**
Total	**17.7511578**	**11**	**1.61374162**

Number of obs =	**12**
F(5, 6) =	**0.29**
Prob > F =	**0.9030**
R-squared =	**0.1939**
Adj R-squared =	**-0.4778**
Root MSE =	**1.5443**

hygiene1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eat1	**.0735247**	**.1216309**	**0.60**	**0.568**	**-.2240953**	**.3711447**
sleep1	**-.0562233**	**.0740019**	**-0.76**	**0.476**	**-.2372996**	**.1248529**
work1	**.0004863**	**.0557266**	**0.01**	**0.993**	**-.1358718**	**.1368444**
other1	**.0196835**	**.0653608**	**0.30**	**0.773**	**-.1402487**	**.1796156**
wowp1	**.0062038**	**.0764118**	**0.08**	**0.938**	**-.1807692**	**.1931767**
_cons	**6.101071**	**3.978847**	**1.53**	**0.176**	**-3.634817**	**15.83696**

13 . log close

log: **C:\Documents and Settings\nhunter\Desktop\WoWLog13-22.smcl**
log type: **smcl**
closed on: **11 May 2005, 17:04:30**

Appendix 2-C


```
  ___  ____  ____  ____  ____tm
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/
  Statistics/Data Analysis
```

```
      log:  C:\Documents and Settings\nhunter\Desktop\WoWLog23+.smcl
 log type:  smcl
opened on:  11 May 2005, 17:05:32
```

1 . regress wowp0 other0 work0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	4804.04933	5	960.809866
Residual	2013.89511	12	167.824593
Total	6817.94444	17	401.055556

Number of obs =	18
F(5, 12) =	5.73
Prob > F =	0.0063
R-squared =	0.7046
Adj R-squared =	0.5815
Root MSE =	12.955

wowp0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other0	-.5421831	.368679	-1.47	0.167	-1.345466	.2610994
work0	-.7895263	.228807	-3.45	0.005	-1.288054	-.2909988
sleep0	.0865908	.4806621	0.18	0.860	-.9606819	1.133864
eat0	-1.026065	.9698693	-1.06	0.311	-3.139228	1.087099
hygiene0	.7013706	1.884332	0.37	0.716	-3.404236	4.806977
_cons	66.14618	26.00465	2.54	0.026	9.486922	122.8054

2 . regress other0 wowp0 work0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	1321.47455	5	264.294909
Residual	1046.15045	12	87.1792046
Total	2367.625	17	139.272059

Number of obs =	18
F(5, 12) =	3.03
Prob > F =	0.0536
R-squared =	0.5581
Adj R-squared =	0.3740
Root MSE =	9.337

other0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
wowp0	-.2816458	.1915163	-1.47	0.167	-.6989239	.1356323
work0	-.4463987	.1938392	-2.30	0.040	-.868738	-.0240595
sleep0	-.4204533	.3249742	-1.29	0.220	-1.128511	.2876047
eat0	.8943224	.683782	1.31	0.215	-.5955107	2.384156
hygiene0	1.528581	1.292692	1.18	0.260	-1.287954	4.345116
_cons	43.68557	19.5359	2.24	0.045	1.120502	86.25064

3 . regress work0 other0 wowp0 sleep0 eat0 hygiene0

Source	SS	df	MS
Model	3346.99154	5	669.398308
Residual	1609.0779	12	134.089825
Total	4956.06944	17	291.533497

Number of obs =	18
F(5, 12) =	4.99
Prob > F =	0.0105
R-squared =	0.6753
Adj R-squared =	0.5401
Root MSE =	11.58

work0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
other0	-.6866033	.2981429	-2.30	0.040	-1.336201	-.0370057
wowp0	-.630822	.182814	-3.45	0.005	-1.02914	-.2325045
sleep0	-.462391	.4089953	-1.13	0.280	-1.353515	.4287331
eat0	.4249857	.8981161	0.47	0.645	-1.531841	2.381813
hygiene0	.6786974	1.682658	0.40	0.694	-2.9875	4.344895
_cons	78.58876	17.80295	4.41	0.001	39.79946	117.3781

Appendix 2-C

4 . regress sleep0 work0 other0 wowp0 eat0 hygiene0

Source	SS	df	MS
Model	375.25533	5	75.0510659
Residual	724.440782	12	60.3700652
Total	1099.69611	17	64.6880066

Number of obs =	18
F(5, 12) =	1.24
Prob > F =	0.3486
R-squared =	0.3412
Adj R-squared =	0.0668
Root MSE =	7.7698

sleep0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
work0	-.2081782	.1841383	-1.13	0.280	-.6093811	.1930247
other0	-.2911565	.2250389	-1.29	0.220	-.7814742	.1991612
wowp0	.0311485	.1729044	0.18	0.860	-.3455777	.4078748
eat0	1.013346	.533252	1.90	0.082	-.14851	2.175203
hygiene0	.3003435	1.133355	0.27	0.796	-2.169025	2.769712
_cons	46.20639	14.01774	3.30	0.006	15.66436	76.74843

5 . regress eat0 sleep0 work0 other0 wowp0 hygiene0

Source	SS	df	MS
Model	231.623658	5	46.3247315
Residual	163.193085	12	13.5994238
Total	394.816743	17	23.2245143

Number of obs =	18
F(5, 12) =	3.41
Prob > F =	0.0380
R-squared =	0.5867
Adj R-squared =	0.4144
Root MSE =	3.6877

eat0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sleep0	.2282742	.1201244	1.90	0.082	-.0334545	.4900028
work0	.0431022	.0910872	0.47	0.645	-.1553597	.241564
other0	.1395088	.1066658	1.31	0.215	-.092896	.3719137
wowp0	-.0831457	.078592	-1.06	0.311	-.2543828	.0880915
hygiene0	.4336394	.5247647	0.83	0.425	-.7097247	1.577003
_cons	-5.670948	9.03681	-0.63	0.542	-25.36046	14.01857

6 . regress hygiene0 eat0 sleep0 work0 other0 wowp0

Source	SS	df	MS
Model	21.4102354	5	4.28204707
Residual	46.7256639	12	3.89380533
Total	68.1358993	17	4.00799408

Number of obs =	18
F(5, 12) =	1.10
Prob > F =	0.4098
R-squared =	0.3142
Adj R-squared =	0.0285
Root MSE =	1.9733

hygiene0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eat0	.1241602	.1502513	0.83	0.425	-.2032093	.4515298
sleep0	.0193718	.0731002	0.27	0.796	-.1398998	.1786435
work0	.0197085	.0488624	0.40	0.694	-.0867534	.1261705
other0	.0682731	.0577373	1.18	0.260	-.0575257	.1940719
wowp0	.0162729	.0437196	0.37	0.716	-.0789839	.1115297
_cons	1.46356	4.896014	0.30	0.770	-9.203939	12.13106

Appendix 2-C


```
  7 . - preserve

  8 . regress  wowp1 other1 work1 sleep1 eat1 hygiene1

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  5,    12) =    4.19
       Model |  1673.81482     5  334.762965           Prob > F      =  0.0196
    Residual |  959.754621    12  79.9795517           R-squared     =  0.6356
-------------+------------------------------           Adj R-squared =  0.4837
       Total |  2633.56944    17   154.91585           Root MSE      =  8.9431

------------------------------------------------------------------------------
       wowp1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      other1 |  -.5959005   .4163247    -1.43   0.178    -1.502994    .3111931
       work1 |  -.9721088   .2470058    -3.94   0.002    -1.510288   -.4339295
      sleep1 |  -.9587412   .5027412    -1.91   0.081     -2.05412    .1366379
        eat1 |   1.107657   .8033209     1.38   0.193    -.6426286    2.857943
    hygiene1 |   .5965549   1.189192     0.50   0.625    -1.994473    3.187583
       _cons |   98.28094   26.80281     3.67   0.003     39.88263    156.6792
------------------------------------------------------------------------------

  9 . regress other1 wowp1 work1 sleep1 eat1 hygiene1

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  5,    12) =    3.65
       Model |  598.796673     5  119.759335           Prob > F      =  0.0308
    Residual |  394.147771    12  32.8456476           R-squared     =  0.6031
-------------+------------------------------           Adj R-squared =  0.4377
       Total |  992.944444    17  58.4084967           Root MSE      =  5.7311

------------------------------------------------------------------------------
      other1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       wowp1 |  -.2447218   .1709744    -1.43   0.178    -.6172429    .1277994
       work1 |   -.516153   .1876045    -2.75   0.018    -.9249082   -.1073978
      sleep1 |  -.8448289   .2752762    -3.07   0.010    -1.444604   -.2450537
        eat1 |   1.304654   .4064034     3.21   0.007     .4191775    2.190131
    hygiene1 |    1.25536   .6794265     1.85   0.089    -.2249831    2.735703
       _cons |   59.45311   18.19434     3.27   0.007     19.81106    99.09517
------------------------------------------------------------------------------

 10 . regress work1 other1 wowp1 sleep1 eat1 hygiene1

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  5,    12) =   10.60
       Model |  2527.35363     5  505.470726           Prob > F      =  0.0004
    Residual |  572.257479    12  47.6881233           R-squared     =  0.8154
-------------+------------------------------           Adj R-squared =  0.7385
       Total |  3099.61111    17  182.330065           Root MSE      =  6.9057

------------------------------------------------------------------------------
       work1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      other1 |  -.7493951   .2723803    -2.75   0.018    -1.342861   -.1559293
       wowp1 |  -.5796237   .1472782    -3.94   0.002    -.9005153   -.2587322
      sleep1 |  -1.136875   .2977712    -3.82   0.002    -1.785663    -.488087
        eat1 |    1.49279   .5099387     2.93   0.013     .3817294    2.603851
    hygiene1 |   1.407603   .8341344     1.69   0.117    -.4098198    3.225026
       _cons |   92.24588   14.11299     6.54   0.000     61.49632    122.9954
------------------------------------------------------------------------------
```

Appendix 2-C


```
11 . regress sleep1 work1 other1 wowp1 eat1 hygiene1

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  5,    12) =    4.20
       Model |  424.782534     5  84.9565067           Prob > F      =  0.0194
    Residual |  242.842466    12  20.2368722           R-squared     =  0.6363
-------------+------------------------------           Adj R-squared =  0.4847
       Total |     667.625    17  39.2720588           Root MSE      =  4.4985

------------------------------------------------------------------------------
      sleep1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       work1 |  -.4824428   .1263618    -3.82   0.002    -.7577615    -.207124
      other1 |  -.5205163   .1696033    -3.07   0.010      -.89005   -.1509825
       wowp1 |   -.242586   .1272064    -1.91   0.081     -.519745    .0345729
        eat1 |   .9878836   .3283706     3.01   0.011     .2724255    1.703342
    hygiene1 |   .8713283   .5495994     1.59   0.139    -.3261459    2.068802
       _cons |   62.87163   7.485667     8.40   0.000     46.56176     79.1815
------------------------------------------------------------------------------

12 . regress eat1 sleep1 work1 other1 wowp1 hygiene1

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  5,    12) =    3.83
       Model |  170.523594     5  34.1047188           Prob > F      =  0.0264
    Residual |  106.986545    12  8.91554546           R-squared     =  0.6145
-------------+------------------------------           Adj R-squared =  0.4538
       Total |   277.51014    17  16.3241259           Root MSE      =  2.9859

------------------------------------------------------------------------------
        eat1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      sleep1 |   .4352215   .1446668     3.01   0.011     .1200196    .7504233
       work1 |    .279085   .0953357     2.93   0.013     .0713663    .4868037
      other1 |   .3541323   .1103132     3.21   0.007     .1137806    .5944841
       wowp1 |   .1234737   .0895484     1.38   0.193    -.0716356    .3185829
    hygiene1 |  -.3239422   .3901326    -0.83   0.423    -1.173968    .5260838
       _cons |  -27.55467   10.32168    -2.67   0.020    -50.04367   -5.065664
------------------------------------------------------------------------------

13 . regress hygiene1 eat1 sleep1 work1 other1 wowp1

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  5,    12) =    1.49
       Model |  34.2771362     5  6.85542723           Prob > F      =  0.2655
    Residual |  55.3938289    12  4.61615241           R-squared     =  0.3823
-------------+------------------------------           Adj R-squared =  0.1249
       Total |  89.6709651    17  5.27476265           Root MSE      =  2.1485

------------------------------------------------------------------------------
    hygiene1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        eat1 |  -.1677257   .2019968    -0.83   0.423     -.607839    .2723875
      sleep1 |   .1987552   .1253669     1.59   0.139    -.0743958    .4719063
       work1 |   .1362543   .0807432     1.69   0.117    -.0396701    .3121786
      other1 |   .1764293   .0954871     1.85   0.089    -.0316193    .3844778
       wowp1 |   .0344312   .0686362     0.50   0.625    -.1151143    .1839766
       _cons |  -10.39763   8.883223    -1.17   0.265    -29.75251    8.957247
------------------------------------------------------------------------------

14 . log close
       log:  C:\Documents and Settings\nhunter\Desktop\WoWLog23+.smcl
  log type:  smcl
 closed on:  11 May 2005, 17:08:59
-------------------------------------------------------------------------------
```

Appendix 2-D


```
  ___  ____  ____  ____  ____tm
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/
  Statistics/Data Analysis
```

```
      log:  C:\Documents and Settings\nhunter\Desktop\WoWLogTimePrice.smcl
 log type:  smcl
opened on:  11 May 2005, 17:24:28
```

1 . regress wowp0 price0 price1 wowp1 mmod80

Source	SS	df	MS
Model	**2341.67791**	**3**	**780.559304**
Residual	**6185.16375**	**26**	**237.890914**
Total	**8526.84167**	**29**	**294.029023**

Number of obs =	**30**
F(3, 26) =	**3.28**
Prob > F =	**0.0367**
R-squared =	**0.2746**
Adj R-squared =	**0.1909**
Root MSE =	**15.424**

wowp0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
price0	**(dropped)**					
price1	**2.785266**	**4.645137**	**0.60**	**0.554**	**-6.76295**	**12.33348**
wowp1	**.5122935**	**.1772709**	**2.89**	**0.008**	**.147908**	**.876679**
mmod80	**100.1197**	**227.384**	**0.44**	**0.663**	**-367.2748**	**567.5142**
_cons	**-112.8054**	**282.8214**	**-0.40**	**0.693**	**-694.1532**	**468.5424**

2 . regress wowp0 price0 price1 wowp1 mmod60

Source	SS	df	MS
Model	**2314.73053**	**3**	**771.576844**
Residual	**6212.11113**	**26**	**238.927351**
Total	**8526.84167**	**29**	**294.029023**

Number of obs =	**30**
F(3, 26) =	**3.23**
Prob > F =	**0.0387**
R-squared =	**0.2715**
Adj R-squared =	**0.1874**
Root MSE =	**15.457**

wowp0	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
price0	**(dropped)**					
price1	**2.798715**	**4.660889**	**0.60**	**0.553**	**-6.781879**	**12.37931**
wowp1	**.5110483**	**.1797458**	**2.84**	**0.009**	**.1415756**	**.880521**
mmod60	**12.44165**	**43.91983**	**0.28**	**0.779**	**-77.83685**	**102.7202**
_cons	**-8.473642**	**71.39953**	**-0.12**	**0.906**	**-155.2375**	**138.2902**

3 . log close

```
      log:  C:\Documents and Settings\nhunter\Desktop\WoWLogTimePrice.smcl
 log type:  smcl
closed on:  11 May 2005, 17:25:16
```

Appendix 2-E

Trial	Date0	Time0	Date1	Time1	Guilded	Level0	Level1	WoWP0	Other0	Work0	Sleep0	Eat0	Hygiene0	WoWP1	Other1	Work1	Sleep1	Eat1	Hygiene1	Tobacco	Alcohol	Caffeine	PayPlan	OtherMMO	MMOD60	MMOD80	MMOD	Age	Wage	M/F	WoWT	RLFriend
42	6-Mar	14:25	10-Apr	20:50	1	52	60	30	10	45	6.5	60	52.5	27.5	5	45	6	60	60	0	0	17.5	1	48	1.666667	1.25	1	23-34	$19.05	1	4	1
65	5-Mar	17:33	10-Apr	21:03	0	47	49	35	10	50	7	10	60	1	17.5	55	5	60	52.5	7	1	0	3	0	1.6496	1.2496	1	19-22	$10.00	1	4.5	1
64	5-Mar	17:15	10-Apr	21:18	1	35	46	15	50	17.5	6.5	150	90	12.5	28.5	35	5.5	77	77	140	0	7	1	3	1.6662	1.249999	1	35-50	$14.98	0	5.5	1
63	5-Mar	17:00	10-Apr	21:33	1	38	60	20	10	36	7	120	40	30	15	30	7	120	60	0	1.5	0	3	48	1.666667	1.25	1	23-34	$19.05	1	2.5	1
35	9-Mar	3:04	10-Apr	21:47	1	24	41	26	8.5	22.5	6	30	30	30	30	25	6	30	30	0	0	0	3	12	1.6666	1.25	1	19-22	$10.00	1	3	1
14	5-Mar	16:13	10-Apr	22:00	0	40	53	24	15	56	7.5	90	60	10	15	52	8	60	37.5	0	0	14	1	6	1.6665	1.25	1	13-18	$10.00	1	3	1
15	5-Mar	16:30	10-Apr	22:08	1	40	43	17.5	25	36	5.5	90	40	6	24	40	7	40	50	0	0	1	N/A	0	1.6598	1.24992	1	13-18	$10.00	1	6	0
31	9-Mar	1:57	10-Apr	22:56	1	24	51	30	10	40	6	25	15	35	5	40	5.5	60	17.5	0	0	47.5	3	18	1.666667	1.25	1	23-34	$19.05	1	4	1
60	17-Mar	1:13	16-Apr	16:18	1	22	36	9.5	8.5	42.5	9	120	60	17	9.5	40	8	120	37.5	0	7	4	1	24	1.666667	1.25	1	35-50	$19.05	1	6	1
54	16-Mar	19:22	16-Apr	16:20	0	27	60	20	18	36	5	60	30	35	17	36	5	60	25	0	7	4	3	36	1.666667	1.25	1	23-34	$19.05	1	3	1
4	16-Mar	23:33	16-Apr	16:41	1	45	52	17.5	17.5	40	5.5	75	30	15	15	40	6	90	25	0	0	38.5	6	48	1.666667	1.25	1	23-34	$19.05	1	5	1
61	17-Mar	1:30	16-Apr	16:48	1	43	59	40	30	8	5.5	30	120	80	80	0	10	180	60	0	0	0	6	12	1.6666	1.25	1	13-18	$10.00	1	2	0
16	17-Mar	1:54	16-Apr	16:56	1	16	36	10	20	50	6	120	60	20	5	45	7	60	60	0	2	7	GC	3	1.6496	1.2496	1	23-34	$19.05	1	2	1
43	6-Mar	14:35	16-Apr	17:01	1	49	55	5	10	30	9	120	60	6	10	20	7	60	45	0	2	3	1	0	1.6656	1.249984	1	13-18	$10.00	1	7	1
12	5-Mar	15:45	16-Apr	17:08	1	50	60	40	10	50	6.4	60	60	20	20	50	5.5	60	60	0	0	0	3	0	1.6496	1.24992	1	35-50	$19.05	1	5	1
24	16-Mar	22:15	16-Apr	19:12	1	47	60	20	40	40	7.5	120	45	20	30	40	7.5	150	60	0	0	7	6	36	1.666667	1.25	1	23-34	$19.05	1	5	0
44	6-Mar	14:41	16-Apr	22:11	1	27	41	11	20	40	6.5	60	45	9	20	40	6	60	45	0	0	7	1	0	1.4	1.2	1	13-18	$10.00	1	2	0
32	9-Mar	2:09	16-Apr	22:19	1	42	51	80	3	0	7	20	30	20	7	24	7.5	10	30	0	0	0	1	0	1.624	1.248	1	23-34	$19.05	1	3.5	1
17	17-Mar	1:58	16-Apr	22:30	1	30	37	23	30	30	8.5	120	20	19	30	31	10	180	30	0	0	0	N/A	0	1.6496	1.2496	1	13-18	$10.00	1	4.5	1
6	17-Mar	0:00	17-Apr	14:30	1	32	45	20	40	30	7.5	60	30	22.5	40	35	7	90	30	0	0	0	1	0	1.624	1.24	1	13-18	$10.00	1	3	1
53	16-Mar	19:07	17-Apr	14:38	1	36	49	30	10	60	6	60	60	12	18	60	6	120	85.7	14	0	7	3	36	1.666667	1.25	1	23-34	$14.98	0	3.5	1
19	16-Mar	21:15	17-Apr	16:34	1	50	57	12.5	12.5	40	4.5	30	60	7.5	11	40	6	60	30	7	7	7	N/A	0	1.6496	1.248	1	23-34	$19.05	1	3.5	1
22	16-Mar	21:43	17-Apr	17:38	1	60	60	30	20	17.5	8	25	45	27.5	12.5	20	7	30	60	0	0	12.5	6	66	1.666667	1.25	1	23-34	$19.05	1	5	0
23	16-Mar	21:56	17-Apr	22:13	1	43	60	10	20	50	6.5	45	30	7	7.5	45	7	30	30	0	0	0	6	0	1.6598	1.24992	1	19-22	$10.00	1	6	1
1	16-Mar	22:52	20-Apr	23:43	1	29	50	10	31	48	5	60	60	20	20	50	6	60	60	0	0	5	1	84	1.666667	1.25	1	23-34	$19.05	1	5	1
41	26-Mar	15:22	23-Apr	16:34	1	46	53	30	20	29	7.5	45	25	25	45	30	7.5	30	30	0	0	0	N/A	12	1.666667	1.25	1	13-18	$9.38	0	6	0
38	26-Mar	14:58	23-Apr	16:38	1	40	45	12.5	20	50	5.5	120	45	10	22.5	49	5.5	90	37.5	70	4	45	3	120	1.666667	1.25	1	35-50	$19.05	1	6	1
46	26-Mar	16:51	8-May	16:03	0	9	3	10	15	50	7.5	120	60	12.5	10	45	7.5	90	60	0	1	0	6	0	1.4	1.2	1	23-34	$14.98	0	2	1
37	26-Mar	14:47	8-May	19:00	1	46	58	3	30	37.5	8.4	45	30	7	10	35	6.5	90	30	0	0	0	GC	0	1.624	1.248	1	13-18	$10.00	1	4	1
7	26-Mar	15:38	8-May	19:11	0	10	50	70	20	0	7	60	60	60	20	0	7	60	30	Addict	0	Addict	3	0	1.6496	1.24	1	23-34	$19.05	1	5	1
13	5-Mar	16:00			1	23		10	3	40	7	60	20							0	0	0	GC	0								
67	5-Mar	18:01			1	52		12.5	20	45	6.5	22.5	37.5							0	0	7	6	24								
45	6-Mar	14:51			0	11		15	8	45	6.75	60	20							56	4	70	1	0								
33	9-Mar	2:35			0	10		25	50	30	8.6	2	60							0	1	0	GC	0								
52	16-Mar	18:57			1	29		30	15	40	8	90	30							0	3.5	0	1	84								
55	16-Mar	19:32			0	7		39	45	0	7	120	40							140	0	70	1	84								
18	16-Mar	21:09			1	22		7.5	40	55	6	30	30							7	3.5	7	N/A	36								
20	16-Mar	21:24			1	20		17.5	20	30	5.5	60	30							3	70	17.5	6	0								
2	16-Mar	23:04			1	33		20	30	40	7.5	10	90							0	0	0	1	24								
3	16-Mar	23:28			0	8		2.5	2.5	70	6.5	90	30							0	0	6	1	9								
57	17-Mar	0:18			1	17		20	31.5	37.5	8.5	90	17.5							0	0	0	N/A	0								
58	17-Mar	0:50			1	57		7	13.5	52.5	5.5	52.5	52.5							0	0	0	1	60								
59	17-Mar	1:03			0	11		15	20	45	6	60	90							7	12	70	3	0								
36	26-Mar	14:36			1	35		35	5	40	5	120	120							0	0	0	6	0								
39	26-Mar	15:06			1	33		6	12	45	9	180	90							0	0	0	1	0								
8	26-Mar	15:48			0	12		8	15	30	5	60	60							0	0	14	1	12								
9	26-Mar	16:03			1	50		35	5	25	7	30	30							0	0	35	1	96								
10	26-Mar	16:16			0	15		20	20	65	6.5	120	60							70	0	0	1	18								
11	26-Mar	16:34			1	41		10	0	70	6	120	60							0	0	10	6	0								
47	26-Mar	17:16			1	30		12	20	25	8	30	20							0	0	21	3	0								
48	26-Mar	17:20			1	42		18	20	16	8	60	30							0	1.5	14	1	0								
49	26-Mar	17:27			0	9		45	22.5	50	8.5	120	60							0	0	14	1	3								
51	26-Mar	17:50			1	60		16.5	23	40	5.5	90	45							0	0	7	1	156								
25	26-Mar	23:16			1	33		16	4.5	22.5	6.2	60	60							0	0	5	2	18								
26	26-Mar	23:29			1	24		12	12	40	8	120	120							0	0	14	6	0								
27	26-Mar	23:47			1	29		15	0	90	4.5	30	30							0	0	0	1	0.5								
28	26-Mar	23:57			1	21		23.5	8	16	8	60	20							0	0	0	1	0								
29	27-Mar	0:03			0	7		25	22.5	30	5	90	90							0	0	35	1	48								
50	26-Mar	17:37			1	28		22		0														0								
40	26-Mar	15:12			1	39		100	0	30														0								
62	25-Mar	23:05			0	51		35																								
5	16-Mar	23:44			1	40		31.5																0								
21	16-Mar	21:33			0	24		23																								
56	16-Mar	20:02			0	6		42	10	49	7	60	40							0	0	0	N/A	15								
34	9-Mar	2:57			0	3		17.5	10	10	8	1.5	30							0	0	5	GC	12								
30	9-Mar	1:45			0	6		25	40	25	7	120	20							0	0	25	3	6								
66	5-Mar	17:41			1	29		20	24	48	6	35	37.5							0	0	0	6	2								

Appendix 2-E

Trial	OtherCha	HighLV	Addict	Negativ	Huma	Dwarf	Gnome	NightEl	Taur	Troll	Und	Orc	Warrior	Hunter	Warloc	Priest	Mage	Rogue	Paladin	Sham	Druid	ServerNorm	ServerPVP	ServerLow	ServerMed	ServerHigh	WeekRep0	WeekRep1
42	1	60	0	0						1								1						1		1		85.5%	79.5%
65	1	49	0	0		1						1										1				1	90.6%	72.4%
64	1	46	0	0				1						1									1				1	92.9%	78.8%
63	1	60	1	0			1								1							1				1	79.6%	86.3%
35	1	41	1	0					1													1		1		1		63.1%	79.8%
14	1	53	0	0	1								1									1				1		98.2%	85.9%
15	1	43	0	0	1															1			1				1		78.7%	77.1%
31	1	51	1	0							1							1					1		1		75.4%	75.9%
60	1	40	0	0	1													1							1			1	86.0%	83.9%
54	1	59	0	0							1						1					1			1			71.1%	79.1%
4	1	52	0	0							1		1									1				1		74.9%	74.7%
61	0	59	1	1			1											1							1			1	79.8%	153.6%
16	0	36	0	0							1						1						1				1		85.1%	79.2%
43	0	55	0	1					1													1		1		1		76.8%	57.9%
12	1	60	1	1				1														1	1			1		94.5%	84.8%
24	1	60	1	1				1										1					1	1			102.2%	99.4%
44	1	41	0	0					1			1												1		1		76.6%	73.4%
32	0	60	1	0							1							1						1		1		82.0%	64.4%
17	1	37	0	1					1													1			1				1		94.5%	103.9%
6	1	45	1	0						1									1						1				1		91.1%	95.5%
53	1	49	0	0							1						1						1		1			92.9%	92.9%
19	1	57	0	0				1						1										1	1			63.7%	66.1%
22	1	60	1	1	1										1										1	1			78.4%	71.1%
23	0	60	0	1	1										1										1	1			79.9%	68.8%
1	1	60	0	0								1						1				1				1		82.1%	86.9%
41	1	53	1	0				1											1						1		1		83.1%	94.9%
38	1	45	1	1	1											1								1		1		83.5%	80.3%
46	1	36	0	0				1															1		1		1		88.4%	81.8%
37	1	58	0	1			1											1							1		1		82.2%	66.4%
7	1	60	0	0	1													1					1				1		91.1%	83.0%
13									1									1						1				1		66.3%	0.0%
67					1															1				1				1	77.4%	0.0%
45										1													1		1		1		74.2%	0.0%
33										1						1										1		1		102.6%	0.0%
52												1							1				1		1			92.3%	0.0%
55										1													1		1		1			90.3%	0.0%
18						1								1										1	1			90.2%	0.0%
20					1											1										1	1			69.3%	0.0%
2											1				1								1				1		91.8%	0.0%
3												1				1							1				1		80.1%	0.0%
57									1															1		1			1	95.9%	0.0%
58									1											1						1			1	73.7%	0.0%
59									1															1		1			1	83.0%	0.0%
36					1											1										1		1		85.1%	0.0%
39					1												1									1		1		93.8%	0.0%
8					1											1								1				1		60.7%	0.0%
9					1								1										1				1		72.0%	0.0%
10					1																1			1				1		102.1%	0.0%
11									1											1				1				1		85.1%	0.0%
47						1															1						1		1		70.7%	0.0%
48						1								1										1		1		71.7%	0.0%
49									1															1		1		1		117.9%	0.0%
51									1											1						1		1		79.6%	0.0%
25												1						1						1	1			59.8%	0.0%
26										1													1			1	1			88.1%	0.0%
27										1															1		1	1			85.4%	0.0%
28											1											1			1	1			67.2%	0.0%
29												1						1						1	1			79.5%	0.0%
50					1								1										1		1		13.1%	0.0%
40						1															1						1		1		77.4%	0.0%
62											1							1						1			1	20.8%	0.0%
5												1							1				1				1		18.8%	0.0%
21							1								1										1	1			13.7%	0.0%
56													1		1								1		1			96.2%	0.0%
34										1						1										1		1		57.8%	0.0%
30												1						1						1		1		92.5%	0.0%
66									1													1	1				1	84.8%	0.0%