High altitude mountain economics: Measuring the effects of extreme conditions on consumer behavior

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ABSTRACT

The hypoxic conditions of extreme altitudes have long been known to have psychological and physiological effects on humans. Such conditions may also impact an individual's economic valuation and decision-making process relative to non-hypoxic conditions. Building on prior work both in the psychology of economics and the effects of hypoxia on psychology and decision making, this study gathered consumer decision data at low altitude conditions and on several high altitude mountains to observe any statistical differences in valuation and consumer behavior. High altitude mountains provided an in situ high altitude environment with a population of people that were usually at low altitudes, i.e., they were more likely to feel effects of high altitudes. The consumer decision data was gathered via a survey instrument measuring willingness to accept compensation. It was administered at low altitude via the internet and in person by the author at several high altitude mountain locations on three continents. The present study found statistically different responses to the survey between the low altitude and the high altitude locations, suggesting that extreme environments such as high altitude can impact consumer behavior and the decision-making process. More broadly, consumer behavior and decision-making may vary from the "expected" in situations in which consumers are taken temporarily from their normal conditions.

Keywords: Behavioral Economics; High Altitude Mountains; Hypoxia; Valuation; Utility Maximization

INTRODUCTION

How do extreme situations and environments influence individuals' economic decisions? Exposure to extreme altitudes, for example, is known to have both psychological and physiological effects on humans. How, then, might an extreme high altitude mountain environment impact a consumer's economic valuation and decision-making process relative to a "standard" low (or lower) altitude environment? This study seeks to gather first order consumer decision data at both low altitude/base conditions and high altitude/extreme conditions to investigate potential statistical differences in response and provide insight into the effects of extreme situations and environments on consumer behavior in general.

High altitude mountains were chosen for this study in part because they provide a ready high-altitude environment at which the population found there, i.e., mountain climbers, is not permanently there, but regularly at a low altitude location. That is, the mountaineers reside at lower altitudes, but venture up to higher altitudes in the mountains for objective-driven periods of time. So, there exists a sub-set of the general population that can be readily identified and measured in two different environments. A survey instrument was used to measure willingness to accept compensation for not reaching the summit. This survey was administered via the internet to self-identified mountaineering populations at the "home" low altitude (or lower altitude, hereafter referred to simply as low altitude) environment and in person by the author at high altitude locations on several mountains around the world. The mountains at which the survey was administered were Mt. Hood (Oregon, USA), Aconcagua (Argentina), and the surrounding mountain areas of Mont Blanc (Chamonix, France). The study found that survey responses were statistically significantly different between the low altitude and the high altitude locations. This suggests that extreme environments, conditions, and situations can impact consumer behavior and the decision-making process. The results may, therefore, have implications regarding variations in consumer behavior and consumer decision-making in various other extreme situations in which consumers are taken temporarily from their normal conditions.

BACKGROUND AND CONCEPTS

In experiential scenarios, it has been observed that individuals can experience a particular utility from the hedonic value of participating in a given activity (Kahneman, 1994). A fully-rational individual seeks to maximize lifetime utility while also being loss-averse, and they tend to dislike loss more than they like gain (Rabin, 1998; Kahneman et al., 1990; Tversky and Kahneman, 1991; Thaler, 1980). In general, the status quo is preferred by people in contrast to changes that involve losses, even when those losses are offset by gains. Nevertheless people often exhibit a short-run tendency towards immediate gratification that may appear inconsistent with the maximization of long-run utility (Rabin, 1998). Choices individuals make are often rationalized (Shafir et al., 1993). Furthermore, hindsight bias suggests that an individual will recall experiences, whether in a common or an uncommon situation, environment, or location differently than when actually undergoing those experiences (Hawkins and Hastie, 1990; Christensen-Szalanski and Willham, 1991). In fact, the very act of making a choice makes an individual more likely to view that choice positively in the future (Baliga and Sjöström, 2009). Additionally, it is possible that different seemingly-inconsistent choices made at different times by the same individual could still be consistent with long-run maximization goals (Johnson, 2012).

In this sui generis study exploring certain decision-making behavior of mountain climbers, the detection of a difference in perception of valuation of a particular experience while climbing is investigated. How effects of extreme environment impact an individual's decision is examined when at "home" (low altitude) vs. when experiencing the extreme environment of high-altitude mountains. Does the choice of attempting to climb a particular mountain as revealed by an individual's selection of that mountain result in the individual climber having more positive feelings about that mountain simply for having made the decision to climb it? If so, this could result in a higher perceived value of the mountain. Yet are there effects of a mountain environment, whether physical or psychological, that could result in quite a different valuation when at home than when actually climbing a mountain? If so, can these effects be detected?

Climbing a high altitude mountain is sometimes a single-day process, but quite often requires two or more days to reach the summit.[1] In the case of multi-day climbs, mountaineers begin somewhere at a base camp or base location base of the mountain and proceed to a high camp. On some mountains, climbers try for the summit straight from the high camp. On very high mountains, there are typically several high camps en route to the summit. In that case, a standard approach is to climb from the base camp to a high camp, and then return to the base camp in order to help the body acclimate faster and more efficiently. Then the climber moves to the first high camp, climbs to the next high camp, and returns to the first high camp. This "leap frog" approach continues until the climber makes a bid for the summit. "Summit Day" very often starts somewhere between 9pm the evening before and 1 am the same day, but depends on factors such as the particular mountain and weather conditions. The timing is due to mountain conditions so that climbers can have a sufficient window to reach the summit and return to the next lower camp before ice conditions become too dangerous due to melting during the day. Many scenarios can prevent climbers from reaching the summit, including injury, illness, weather, mountain conditions, and other factors, most of which are beyond the control of the individual. It is not uncommon for even experience climbers not to reach a summit during a given climbing expedition.[2]

It has been observed that preferences are determined by outcomes relative to a reference level (Kahneman et al., 1990). The farther one is from one's reference level, the less sensitive one is to changes (Kahneman and Tversky, 1979). A reference level such as sensitivity to change in probability of achieving a summit may change from the individual's home to the base camp and as the climber makes the final attempt for the summit. When individuals fail to anticipate changes in reference levels, they also typically exaggerate expected utility changes from occurrences (Rabin, 1998). As the environment in which a climber is located changes, the reference level can change without the climber being aware of it because of situation habituation. Consequently, valuation of reaching the summit could change as environment and reference levels change, resulting in the climber having an exaggerated valuation of the summit compared to the original valuation. On the other hand, if a climber's reference level remains constant at, say, a low altitude location such as a permanent residence, it is possible that a climber in a high

[1] For example, Mt. Rainier typically takes 2-3 days to climb (though some "speed climbers" will do it in one day), Aconcagua is approximately a three-week expedition, and Mt. Everest is approximately a two-month expedition.
[2] This fact is surely a driving force behind the development of various climbing packages for Mt. Everest and other similar major mountains in which climbers can plan only to get to base camp, Camp 1, Camp 2, etc. In this way they can build up to the summit without the pressure or expense of a full summit-bid expedition.

altitude setting would be farther from the reference level and hence less sensitive to changes that may be imposed. Thus, it may be the case that the length of time one spends at high altitude influences relative level. A climber who participates in a brief climb at high altitude, such as one requiring only one to three days, may not experience a shift in reference level. In contrast, one participating in a major mountain expedition taking weeks may experience a reference level change while likely not being aware of this change (Pinghin et al., 2012).

Mood states are also known to have an impact on consumer behavior, particularly at the point of decision (Gardner, 1985). The environment of a high-altitude mountain is well-known to impact psychological state and mood of people (Stück et all, 2005; Hornbein, 2001; Bahrke and Shukitt-Hale, 1993) and they may each respond differently to extreme environments (Smith, 2014/2015). Individuals become less risk-averse in hypoxic conditions beginning roughly at 10,000 feet above sea level compared to their more risk-conservative behavior at low altitudes. Even though individuals tend to rely on heuristics in decision-making in general, they rely on them even more at high altitudes (Tversky and Kahneman, 1974; Pighin et al., 2012).

Consumer behavior and decisions can in turn be thought of as relating to the personal routines of the consumer (Rook, 1985). A disruption to an individual's routine or rituals can perhaps result in a change in a decision or valuation outcome. Self-congruence also plays a role in this valuation. Identification with a particular brand, good, or service tends to result in overvaluation (Thomas et al., 2015). Certainly mountaineers identify with the mountains in general relative to the non-mountaineering population. Identification with a particular mountain should increase an individual's value of that mountain. The more the environment is such that it causes stimuli to the individual that promotes more identification with the mountain and with mountains in general, the more pronounced the effects should be.

Positive stimuli tend to generate more efficient responses than those that result in the presence of negative stimuli (Herr et al., 2012; Taylor et al., 2006). It is reasonable to consider that mountaineers may consider the environmental stimuli of high-altitude mountains more positively than a non-mountaineering member of the general public. This is likely due in part to the physical and mental preparation that climbers undergo prior to a climb and due to general personality traits common among climbers, such as risk seeking behavior (Laskar, 2000; Gadd, 2014/2015).

METHODOLOGY

In order to investigate whether consumer valuation was different at high altitude environments compared to low altitude, a survey instrument was devised. The survey was administered via the internet to obtain the low altitude base responses. It was then administered at three high altitude environments on three continents. The first field survey was administered at base camp of Mt. Hood[3] (summit altitude 11,250', base camp altitude approx. 7700'), a mountain in Oregon, USA, in the 3000m category[4]. The second field survey was administered on Aconcagua (summit altitude 22,841', Plaza Argentina base camp altitude approximately 14,000')

[3] Originally it was planned to administer the survey on the summit of Mt. Hood as climbers reached the top. However, at the time of the trip, which was late in the season, conditions on the mountain had deteriorated such that the mountain guide advised not climbing. Some climbers still attempted the summit, unsuccessfully. Other climbers were present on the mountain even though they did not climb.

[4] By convention, altitude categories of mountains are given in meters. Specific altitudes are given in feet. For example, Mt. Rainier's altitude is 14,409'; it is a 4000m mountain since its altitude is greater than 4000m, but less than that of the next higher category, 6000m.

in the Argentine Andes, a 6000m category mountain. The third field survey was administered with both English and French language options in the Chamonix region near Mont Blanc. The precise locations were the Refugio Torino, at an altitude of approximately 10,000', and the outlet on the Aiguille du Midi to the Vallée Blanche at approximately the same altitude.[5] The inclusion of the Chamonix field survey was to include a field survey site that was not one of the four representative mountains in the survey.

The survey sought to elicit an individual's Willingness to Accept (WTA) compensation for not making a particular summit in each of several altitude categories. Representative mountains for each of these categories were chosen and indicated on the survey. The representative mountains were: 3000m, Mt. Hood, Oregon, USA; 4000m, Mt. Rainier, Washington State, USA; 6000m, Aconcagua, Argentina; 8000m, Mt. Everest, Nepal/Tibet.[6] (See also Fig. 1 in the Appendix.) Representative mountains were used to equalize comparison and eliminate the possibility that different respondents may be thinking of different mountains within a given altitude category. That is, two mountains of the same approximate altitude may be quite different in other ways and thus may yield different values. Also, because individuals on the mountains where the field surveys were administered, the target population was clearly mountaineers. It is for this reason that a mountain-related "good," i.e., the summit of the mountain was chosen as the item being valued within the survey. Both the field surveys and the low altitude Internet survey were limited to the mountaineer population.

The survey contained mountain-specific statistical questions such as years of experience climbing. Respondents were asked to indicate whether they had climbed each of the four representative mountains (achieving the summit was not required) and whether or not they would be interested in climbing each of the four representative mountains. Data for each altitude category were restricted for analysis only to those who self-selected as interested in climbing a particular mountain.

Respondents were then told to consider that they would not make the summit of each of the four representative mountains for whatever reason beyond the individual's control and that a fictitious "benevolent banker" would compensate them for not making the summit. For each of the four representative mountains, an offer of compensation was provided based on the combined average costs for guide services and travel cost to the mountain.[7] In different versions of the survey, the order in which the four mountains were provided was varied to help eliminate starting point bias. Respondents were then asked if they accepted the banker's offer or not. If they did not accept the offer, they were asked to indicate how much would be enough to compensate them. If they did accept the offer, they were asked if there were a lesser amount that they would accept as compensation. This section was designed to elicit the individual's WTA for not making the summit, which is used as their economic value of the summit. The results of the

[5] The Rifugio Torino is an overnight full-service mountain hut that provides climbers with a base to climb the many nearby peaks. The Aiguille du Midi has an outlet to the Vallée Blanche (the valley below Mont Blanc) that serves as a common point of entry and departure. Climbers were surveyed after returning to the Aiguille du Midi after climbing, not before.

[6] On the first survey given (Mt. Hood), only the altitude categories were given, i.e., 3000m, 4000m, 6000m, and 8000m. Respondents were also asked to provide some mountains that they were interested in climbing in each category. These responses were considered, along with other factors, such as overall popularity and ease of access to commercial guide services, in determining the four representative mountains.

[7] The values were determined first by obtaining values from commercial guide services and observation of general travel costs. This was then presented in the first field survey administered (Mt. Hood) to obtain a WTA for the mountains.

three high altitude field surveys and the low altitude Internet survey were then compared to determine whether or not statistical differences existed.

RESULTS

The four surveys provided data that, despite the low response numbers, still were useful in gaining insight. The results are believed to be as random as possible, and it is unlikely that, under the conditions in which the survey was administered, any more randomness could be introduced. Several possible explanations exist for the low number of respondents, which include the relatively low number of people on the high-altitude mountains where the survey was administered and the practical limitation to how long one can remain at a remote high-altitude location to collect data over time. Even with the low numbers, the statistical analysis yielded statistically significant differences between the low-altitude and the high-altitude groups.

The low-altitude Internet survey, which was advertised through several mountaineering channels, had 13 respondents. There were 10 respondents who self-indicated as having interest in climbing Mt. Hood. All thirteen respondents had interest in climbing Mt. Rainier. Ten respondents were interested in climbing Aconcagua. Six respondents were interested in climbing Mt. Everest. Only those respondents who self-indicated an interest in climbing a given representative mountain were included in the data set for that specific mountain. The low-altitude survey yielded WTA results that started at 79% for the 3,000m mountain (Mt. Hood) and increased to more than one-and-a-half times the average trip cost for Mt. Rainier and Aconcagua, and close to double the trip cost for Mt. Everest. See the Low Altitude/Internet section of Table 1 and also Fig. 2 in the Appendix.

On Mt. Hood there were 11 respondents. All eleven respondents were included in the WTA data for the 3,000m and 4,000m altitude mountain categories. Only nine respondents indicated a willingness to climb a 6,000m mountain, and only three respondents indicated a willingness to climb an 8,000m. Therefore, two respondents were removed from the data set relative to the 6,000m WTA question, and eight respondents were removed from the data set relative to the 8,000m WTA question. The WTA decision for each included respondent and each altitude category was measured as a percentage of the average trip cost. The number of respondents in each altitude category WTA data set, i.e., 3,000m, 4,000m, 6,000m, and 8,000m, along with the average number of climbers on each representative mountain annually were used to determine the statistical error bands. The mean WTA for not achieving the summit, expressed as a percentage of average total trip cost, along with error bands based on sample size, is given in Table 1 under the Mt. Hood section. The WTA at the 3,000m level was 77% of average trip cost. As the altitude range increased, the percentage of trip cost decreased. See Fig. 3 for a depiction of WTA at the four altitude levels as measured at Mt. Hood. See also the Mt. Hood section of Table 1.

There were 13 respondents to the survey administered at the Plaza Argentina base camp on Aconcagua at approximately 14,000'. This base camp is one used by those climbing the "Polish" routes and is less populated than the Plaza de Mulas base camp. Three respondents on Aconcagua indicated an interest in climbing Mt. Hood. Three were interested in climbing Mt. Rainier. Four were interested in Mt. Everest. All were clearly interested in climbing Aconcagua, as evinced by their presence on the mountain and participation with a climbing party. The WTA decision was calculated as a percent of average trip cost, and the data sets for each of the representative mountain (3,000m/Mt. Hood; 4,000m/Mt. Rainier; 6,000m/Aconcagua; and

8,000m/Mt. Everest) were restricted only to those who indicated interest in said mountains. Error bands were calculated based on the number of respondents in each data set. The lowest WTA was for the 3000m and 4000m mountains, and the highest was for the 6,000m and 8,000m mountains. (See the Aconcagua section of Table 1 and Fig. 4.)

In Chamonix and the Rifugio Torino in the Alps, there were 9 respondents. Four were interested in climbing Mt. Hood and Mt. Rainier. All nine were interested in climbing Aconcagua, and seven were interested in climbing Mt. Everest. As with the other surveys, the WTA decision was calculated as a percent of average trip cost, and the data sets for each of the representative mountain were restricted only to those with self-indicated interest. (See the Chamonix section of Table 1 and Fig. 5.) Similar to Mt. Hood, the respondents' WTA was much higher for the 3,000m and 4,000m mountains than the 6,000m and 8,000m mountains. However, there was much more interest in climbing the major expedition mountains of Everest and Aconcagua than was observed from the respondents on Mt. Hood or even Aconcagua.

DISCUSSION

The results observed on Aconcagua were the opposite of the trend noted for Mt. Hood and Chamonix. Looking just at the results from Aconcagua and Mt. Hood, this could be because climbers on Mt. Hood were primarily American, and both Mt. Hood and Mt. Rainier were located in the US, while a good number of the climbers on Aconcagua were not from the US, and a climb on Mt. Hood or Mt. Rainier would be a major trip for them. Climbers are often more willing to travel to foreign countries for major mountains. However, Mt. Hood, for example, is one of the most climbed mountains in the world. And, expeditions to Aconcagua and Mt. Everest are major expeditions for both Americans and citizens of other countries that were represented at Aconcagua base camp. Recalling that only those climbers that indicated a willingness and interest in climbing a given representative mountain were included in the data set for that mountain, a location effect, then, might be the cause. That is, those climbers who were physically on a 3,000m mountain required more compensation for not making the summit of a 3,000m or 4,000m mountain than a 6,000m or 8,000m mountain, while those respondents physically present on a 6,000m mountain required more compensation for not making the summit of a 6,000m or an 8,000m mountain because of proximity effects.

Also, the respondents at Chamonix were principally non-American, yet the results at Chamonix had an opposite trend to those at Aconcagua, where the respondents were similarly non-American. The data set size for each of the representative mountains was quite different between the Mt. Hood, Aconcagua, and Chamonix populations. There was far less interest in climbing the 6,000m and 8,000m mountains among those surveyed at Mt. Hood and Aconcagua than there was among those surveyed at Chamonix. The Chamonix altitude was approximately 10,000 feet, but not nearly as remote as the Plaza Argentina base camp on Aconcagua, which took three days to reach. A possible and plausible explanation is a different psychological composition between those who were surveyed in Chamonix versus those surveyed at the other locations.

The results gathered at low-altitude and the various high-altitude locations were evaluated for observable differences in valuation of the four representative summits. For the 3,000m representative mountain, Mt. Hood, the valuation of Mt. Hood was approximately the same when measured at Mt. Hood and at low altitude. Therefore, no statistically significant difference could be inferred. The WTA for Mt. Hood as measured on Aconcagua and at

Chamonix, even with the error bands, are entirely outside the error bands of the measurement at low altitude. Further, the WTA as measured on Aconcagua is extremely low, while it is extremely high at Chamonix. Therefore, it is difficult to determine any meaningful cross-correlation between the valuation of the summit of Mt. Hood between the low-altitude and high-altitude samples.

Because the error bands in question lay outside each other, a statistically significant difference is evident between the high-altitude (only Mt. Hood and Aconcagua) and low-altitude results relative to the WTA for Mt. Rainier. The WTA was significantly lower when measured at high altitude on Mt. Hood and Aconcagua than when measured at low altitude. The low altitude WTA was more than 100% of the trip cost. Furthermore, the WTA was statistically different between Mt. Hood and Aconcagua, with the values as measured on Aconcagua being lower than those measured on Mt. Hood. However, there was some overlap between the low altitude results at the high altitude results as measured at Chamonix. In fact, the Chamonix results were much closer to the low-altitude results, which could be due to differences in preferences between the two populations. Mt. Rainier and Mt. Hood are in relatively close physical proximity, and many American climbers, for example, who climb Aconcagua also climb Mt. Rainier and/or Mt. Hood. On the other hand, it is possible that climbers within the Alps region are more interested in climbing the vast array of mountains there, rather than travelling to another continent to climb a mountain of similar altitude.

There was also a statistical difference between the low-altitude results and the high-altitude results measured at all three high-altitude survey locations relative to the WTA for the summit of the 6,000m representative mountain, Aconcagua. As before, the valuation of the summit was significantly higher (well over 100% of the trip cost) at low altitude than at high altitude. There is some overlap between the WTA as measured on Mt. Hood and Chamonix, and between Chamonix and Aconcagua.

With regards to the WTA for the summit of Mt. Everest, there was a statistically significant difference between the low-altitude result and the high-altitude result at all three survey locations. The low-altitude valuation of the summit of Everest was almost twice the average trip cost, while at high altitude across the three locations, it was approximately half the average trip cost. There was some overlap between the results at Chamonix and at Aconcagua, but both were significantly higher than that measured at Mt. Hood.

CONCLUSIONS

This study is a broadening of prior research on the effects of high altitude on psychology and decision making. The conclusions of this study were based upon empirical data obtained using field surveys administered at low-altitude and three high altitude survey sites on three separate continents. The principal conclusion determined is that observable differences in economic valuation at different altitudes can exist. Valuation was observed to be considerably lower when measured at the high-altitude sites, which is consistent with the findings of Pinghin et al. that individuals become more risk seeking relative to losses in conditions of hypoxia as one experiences at high altitude. Unlike the Pinghin et al. study that was conducted in the controlled environment of a laboratory, this study was conducted primarily in the field where it is far more difficult to control conditions.

A potential additional application of this study relates to the psychological phenomenon known as “summit fever,” in which affected climbers develop an obsession with the summit to

the point of recklessly ignoring their own safety and sometimes that of their fellow climbers. If monetary value of a summit is significantly lower when physically on a high altitude mountain, then it is unlikely that summit fever develops due to concerns of lower return on investment by not reaching the summit. The results suggest that climbers in general are ignoring at least some of the sunk costs. Summit fever is more likely due to immediate physiological and psychological effects in which a climber becomes more risk-seeking with regard to the loss. This is known to be a potential effect of hypoxia. In this case, though, the loss in question being risked is not financial, but rather in the form of an injury or death. Also, it could be the case that summit fever represents an extreme form of long-run utility maximization in which climbers assume even greater risk to achieve the summit, a potential factor in their long-run utility maximization goals. It cannot be ruled out, however, that summit fever is merely the pursuit of short-run utility maximization goals such that, due to the increased risky behavior, the expectation value of utility in the long-run is actually less than if the summit had been abandoned due to reasonable safety concerns.

Future research should seek to measure responses to a different array of valuation and decision questions in field settings to compare to both high-altitude and low-altitude laboratory results. Also, longer-term field research when practicable may be beneficial to obtaining a larger sample size. However, in some remote locations, such as Aconcagua, the sample size does not always change frequently in an appreciable manner because climbers remain there for extended periods due to the time required in such an expedition to reach the summit. This experimental aspect could be overcome by a larger team that could work in shifts throughout a climbing season. Additional research into utility maximization in conditions of summit fever could also be both interested and useful to the improvement of safety on the mountains.

Despite the difficulties impacting field research, the statistical data in this study were reasonable and meaningful, and validated the study hypothesis that high altitude and low altitude behaviors are statistically observable. The exact direction of this expected change could not be known a priori. The fact that the summit valuation was found to be lower at high altitude not only demonstrates consistency with the Pinghin et al. laboratory study on decision making in hypoxic conditions, it also suggests that a reference level effect may be a factor in such hypoxic scenarios. Because individuals feel changes less the farther they are from their reference point, the results of this study suggest that the natural reference point regarding atmospheric pressure[8] is the relatively low-altitude level at which most people live. Climbers go to high altitudes for relatively brief periods of time and then return to their reference level. Therefore, at the high-altitude location, they are further away from their reference point and are less likely to feel a changeless than they would when they contemplate that scenario in the low altitude conditions of their reference level.

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[8] Oxygen concentration is consistent in the atmosphere at all altitudes. It is instead the air pressure that changes, creating a lower effective oxygen concentration at higher altitudes, even though the true oxygen concentration remains the same.

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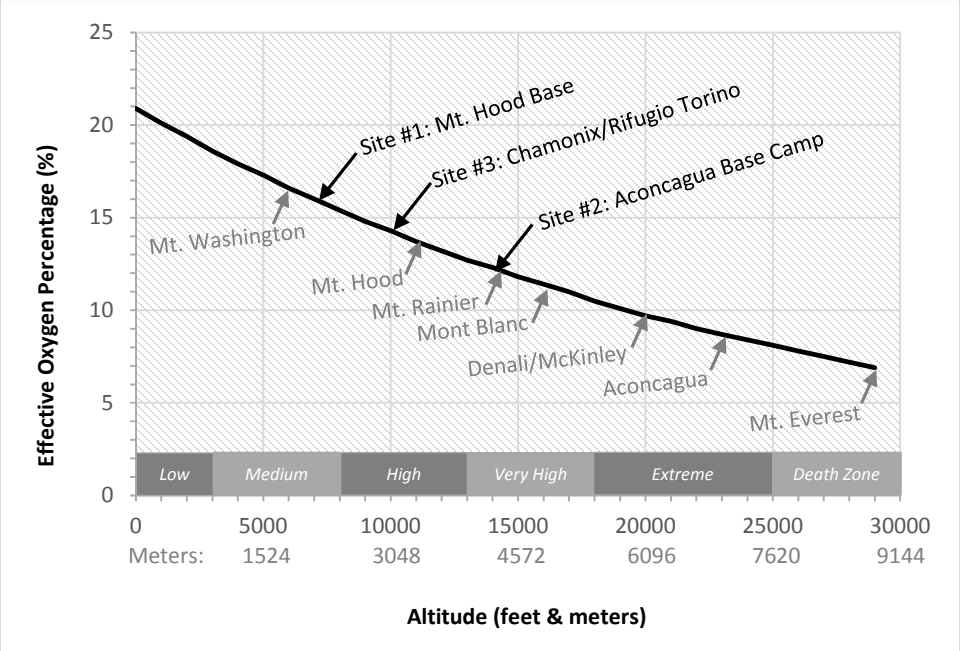
Table 1.
Willingness to Accept Compensation for Not Making the Summit as a Percent of Offer (Average Commercial Trip Cost)

Location of Survey	Altitude of Summit	Lower	Mean	Upper
Low Altitude/ Internet	*3000m*	66%	79%	91%
	4000m	149%	174%	200%
	6000m	141%	166%	191%
	8000m	145%	182%	219%
Mt. Hood	**Altitude of Summit**	**Lower**	**Mean**	**Upper**
	3000m	65%	77%	89%
	4000m	55%	65%	75%
	6000m	40%	48%	56%
	8000m	23%	33%	43%
Aconcagua	**Altitude of Summit**	**Lower**	**Mean**	**Upper**
	3000m	4%	5%	6%
	4000m	24%	33%	43%
	6000m	75%	87%	99%
	8000m	56%	74%	93%
Chamonix/ Rifugio Torino	**Altitude of Summit**	**Lower**	**Mean**	**Upper**
	3000m	122%	163%	204%
	4000m	92%	122%	153%
	6000m	58%	71%	84%
	8000m	54%	67%	80%

Figure 1.
Location of Field Survey Locations and
Effective Oxygen Percentage at Various Altitudes



Locations of field survey sites are indicated above the line. For reference, the summit altitudes of the representative mountains in this study, as well as certain other well-known peaks, are included below the line. At the bottom of the chart area, common names for each altitude category are provided.

Figure 2.
Willingness to Accept Compensation for Not Making the Summit as a Percent of Offer (Average Commercial Trip Cost) as Measured at Low Altitude

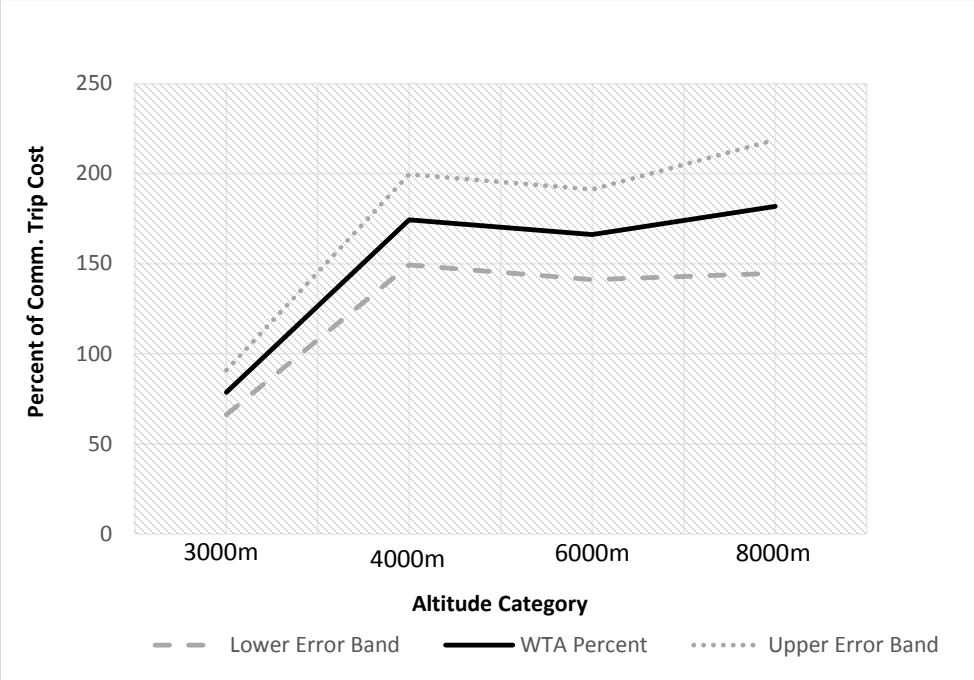


Figure 3.
Willingness to Accept Compensation for Not Making the Summit as a Percent of Offer (Average Commercial Trip Cost) as Measured at High Altitude Location #1 (Mt. Hood, Oregon, USA)

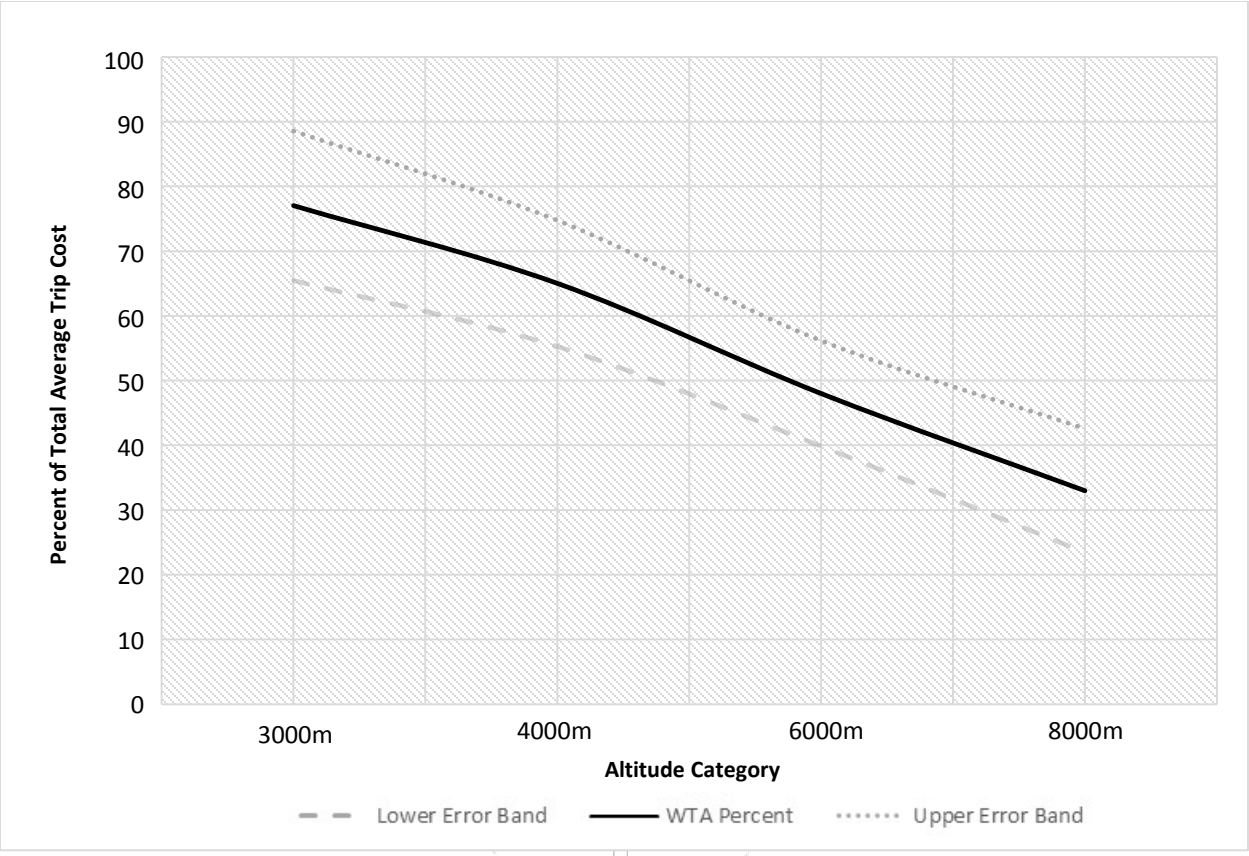


Figure 4.
Willingness to Accept Compensation for Not Making the Summit as a Percent of Offer (Average Commercial Trip Cost) as Measured at High Altitude Location #2 (Aconcagua, Argentina)

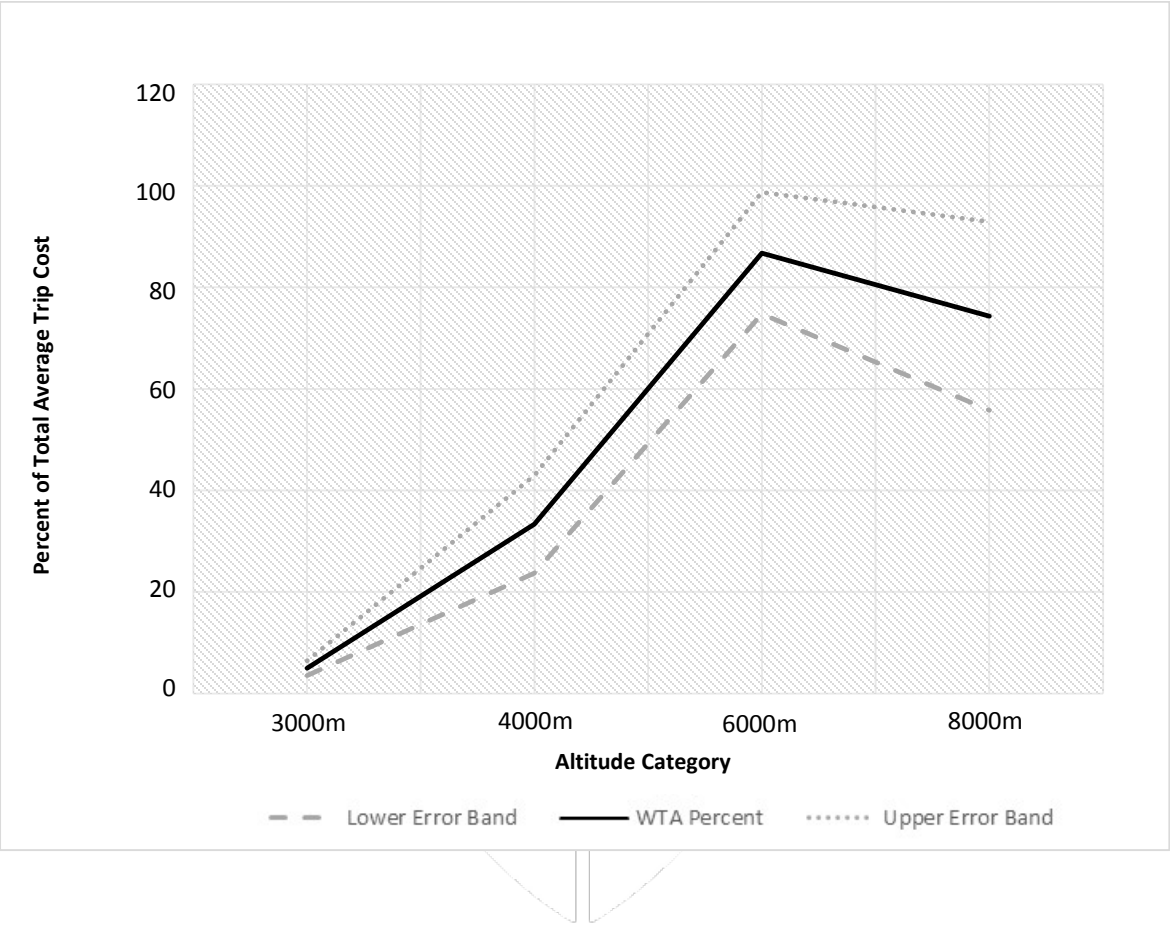


Figure 5.
Willingness to Accept Compensation for Not Making the Summit as a Percent of Offer (Average Commercial Trip Cost) as Measured at High Altitude Location #3 (Chamonix, France, Rifugio Torino, Italy)