CHAPTER 9

STATISTICAL ANALYSIS

9.1 Introduction

A simple statistical analysis of data derived from key-shaped formed unifaces was conducted at Simon Fraser University using the Michigan Interactive Data Analysis System (MIDAS) programs (Fox and Guire 1976). The resulting statistical measures were used to help describe and compare various selected qualitative and quantitative attribute variables possessed by: (1) the 129 specimens comprising the prehistoric study sample; (2) the 35 items representing the prehistoric microwear sub-sample; and (3) the eight replicated experimental woodworking tools (Chapters 2.2, 6 and 8; Appendices 3 and 6; Tables 1 and 5 to 13).

9.2 Statistical Methods and Procedures

Descriptive Statistics

The objective of the descriptive statistical analysis was to generate measures that could be used to help describe and compare attribute variables between sample specimens, and between sample sets.

Common measures of central tendency and dispersion (e.g., mean, mode, standard deviation, minimum and maximum values) were calculated for continuous variables. These are presented in Tables 1, 5 and 6. Continuous variable data were recorded and described using common units of measurement (i.e., grams, millimeters, and angles). Nominal and ordinal scale variable data are presented in Appendices 3 and 6.

Frequency histograms for individual continuous and discrete variables were produced using several different interval widths. They provided visual impressions of frequency distributions that were useful for detecting significant data clustering and/or skewness.

Inferential Statistics

Use of inferential statistical procedures to assist in interpreting data derived from microwear studies is not a common practice despite their previously acknowledged potential (see Nance 1979; Stafford and Stafford 1979). Nevertheless, some studies have successfully employed statistical methods to solve a number of problems (Chandler and Ware 1976; Nance 1977; Stafford 1977; Odell 1977; Siegel 1984,1985; Vaughan 1985; Schutt 1982; Lewenstein 1981; Richards 1987).

The Pearson Product-Moment correlation coefficient (Blalock 1972:376-395; Freedman, Pisani, and Purves 1978: 116-120; Thomas 1986:383-387) was calculated for selected pairs of continuous variables exhibited on the prehistoric tools in order to determine the strength and direction of any linear relationships between them. A value of +1.00 is obtained when the case values for two variables are correlated in a positive direction (i.e., as the value of one variable increases, the other also increases proportionately). A value of -1.00 indicates that the case values are perfectly negatively correlated (i.e., as one variable increases, the other decreases proportionately). Correlation was assessed at the .05 significance level (Tables 11 and 12).

The strength and direction of relationships indicated between selected pairs of ordinal scale variables represented for the prehistoric microwear sub-sample specimens was determined using the Spearman Rank Order correlation coefficient (Leach 1979:190-194; Thomas 1986:395-405). This statistical test is the standard product-moment correlation coefficient for case values of two ranked variables being compared. A value of +1.00 is obtained when the rankings are identical in a positive direction (i.e., as the frequency or intensity of one variable increases, so does the other). A value of -1.00 indicates that the rankings are perfectly negatively correlated (i.e., when one variable increases in frequency or intensity, and the other decreases proportionately).

For this calculation, each ordinal variable was ranked according to ascending value or level of degree. Microflake frequencies for the primary functional edges were ranked using a four-part scale. For the distal projection tip: (1) = absence of microflakes; (2) = 1 microflake; (3) = 2 microflakes; and (4) = more than 3 microflakes. For the concave and "opposite" margins: (1) = 0 to 2 microflakes; (2) = 3 to 5 microflakes; (3) = 6 to 8 microflakes; and (4) = 9 to 11 microflakes. Mean edge angles for all three margins were also ranked using a four part scale: (1) = 30° to 55°; (2) = 60° to 75°; (3) = 80° to 95°; and (4) = 100° to 115°.

Four-part scales were also used to rank relative degrees of edge rounding and smoothing intensity, crushing intensity, and striation intensity (1) = absent; (2) = slight; (3) = moderate; and (4) = pronounced); and polish intensity, (1) = absent; (2) = dull; (3) = moderately bright; and (4) = bright. Again, correlation strength was assessed at the .05 significance level. Values for Spearman's rank-order correlation coefficients for selected pairs of variables are presented in Table 13 and their interpreted significance is discussed below.

Scatter plots for selected pairs of variables were also generated to provide a visual supplement to the correlation coefficients to detect clustering, linear relationships, and outliers.

9.3 Study Sample Statistical Analysis Results

High frequencies of certain variables represented in the 129 prehistoric study sample specimens were considered to be indicative of certain important and deliberate decisions made by prehistoric people during the manufacture of key-shaped formed unifaces, and they also reflect recurrent and predominant behaviour patterns associated with their use. Several traits are rather obvious because of their high frequencies, and are worthy of mention and discussion here.

The majority (54.3%) of the 129 key-shaped formed unifaces comprising the prehistoric study sample were recovered from housepit sites (i.e., winter pithouse villages), and (34.9%) were found at lithic scatter sites (i.e., non-housepit encampments and/or resource extraction and processing locations). Thus, at first glance it appears that these tools are more commonly represented at winter pithouse villages than at lithic scatter sites. However, the sample population from which the tools were drawn is very heavily biased in favour of housepit sites because most Canadian Plateau researchers have chosen to conduct large-scale excavations at pithouse villages, and past resource management policy has relegated high priority status to this site type. Indeed, about 70% of *all* excavated components on the Canadian Plateau are from housepit sites, and many have been extensively and intensively investigated. Only about 15% of components excavated on the Canadian Plateau belong to non-housepit lithic scatter sites (see Richards and Rousseau 1987: Tables 1-3). This is unfortunate, since it is my experienced impression that lithic scatter sites on the Canadian Plateau dating between ca. 3500 and 1000 BP are far more numerous than housepit sites belonging to the same period.

If key-shaped formed unifaces were made, used, and discarded just as frequently at housepit sites as they were at large non-housepit lithic scatter sites between ca. 3500 and 1000 BP, it follows that the relative frequencies of these items should be more or less similar in tool assemblages of comparable size from both site types. However, this pattern does not seem to be the rule. Notably high frequencies of key-shaped formed unifaces compared to other chipped stone tool types have been recovered from several excavated and surface collected non-housepit residential base camp sites dating between ca. 3500 and 1000 BP. These sites include EaQl 10 and EaQl 14 in the Arrow Lakes region, DhQv 48 (Copp 1979) and DlQv 39 (Rousseau 1984) in the Okanagan Valley, and FiRs 1 in the Chilcotin region (Fladmark 1976; Montgomery 1978).

Although numerous key-shaped formed unifaces have been recovered from housepit sites EeQw 3 and EeQw 6 in the South Thompson - Shuswap region (Fladmark pers. comm. 1988), they represent only a small proportion of thousands of artifacts surface collected from these two very large pithouse villages. Several extensively excavated housepit sites on the Canadian Plateau have also yielded very large assemblages of chipped stone tools from components predating ca. 1000 BP, but these sites have all produced comparatively low frequencies of key-shaped formed unifaces (see Borden 1968; Stryd 1973; Turnbull 1977; Wilson 1980; Richards and Rousseau 1982; Hayden pers. comm. 1988).

As I have previously suggested and discussed in Chapters 3.3, 3.6 and 8.4, it seems that key-shaped formed unifaces were used most frequently during non-winter months of the year. Given the increased group and residential mobility practiced by most Interior Plateau groups during the non-winter months to exploit and process seasonally available and widely distributed resources (see Teit 1900,1909; Ray 1933; Palmer 1975), adoption and extensive implementation of task-specific curated tool technologies would have helped to mitigate the severity of logistical problems presented directly by, or associated with, these subsistence activities. Highly reliable and maintainable curated tools (Bleed 1986) were often used by aboriginal hunter-gatherer groups participating in a logistical subsistence and settlement system because: (1) they allowed mobile task groups to "gear up" with task-specific tools prior to leaving base camps on subsistence forays so that extraction and processing activities could be quickly and effectively dispatched at resource locations (Binford 1979); (2) they helped to alleviate "time-stress" problems arising from mutually conflicting resource procurement and processing activites and the time required to produce tools needed to undertake them (Torrence 1983); and (3) they helped to extend tool use-lives and accomodate recycling, which helped to offset critical shortages of raw materials required for tool production (Bamforth 1986a). Since key-shaped formed unifaces are plainly efficient, reliable, and maintainable, and constitute a task-specific component of a curated technological system (Chapter 3.6), I suggest it is realistic to expect that they would have been commonly used and discarded at sites occupied during non-winter months of the year (i.e., large "lithic scatter" residential base camp sites) when logistical subsistence practices were most intense.

In contrast, heavy reliance on stored resources during the winter months was accompanied by a marked reduction in group mobility and scheduling stress, and ample raw materials for tool production were most probably collected and stored at pithouse villages prior to the onset of inclement weather. Therefore, high frequencies of "expediently" produced lithic tools (i.e., utilized flakes, unformed unifaces) compared to other well-made formed/curated tools (i.e., endscrapers, knives, drills, perforators, gravers, etc.) observed in many excavated assemblages from winter housepit sites is a commonly observed pattern that should be neither surprising or unexpected (see also Parry and Kelly 1987).

In conclusion, I submit that the currently held impression that key-shaped formed unifaces constitute a relatively "rare" tool type on the Plateau might be more correctly attributable to biases related to researcher interest and heritage resource management policy which have both long emphasized a priority for investigation of winter housepit sites. Future excavations conducted at non-winter residential base camps sites with components dating between ca. 3500 and 1000 BP will likely indicate that these tools are indeed more common at this site type than at housepit sites, and that they are really not as rare as currently perceived. Unfortunately, the presently small sample of excavated non-winter residential base camp sites from the Canadian Plateau does not allow this hypothesis to be adequately assessed.

Large, non-winter, base camps and aggregation sites might be expected to contain a greater frequency of key-shaped formed unifaces because retooling and discard of curated tools were likely common practices at such sites (see also Keeley 1982). Alternately, I expect that key-shaped formed unifaces will be relatively rare at small, short-term, task-specific, resource extraction and/or processing locations (i.e., root roasting sites, hunting lookouts, small hunting camps, fishing stations, etc.) which are associated with a high degree of mobility and curational behaviour. The notable paucity of key-shaped formed unifaces at many intensively investigated sites of these types in Upper Hat Creek Valley (Pokotylo pers. comm. 1989) supports this hypothesis.

Descriptive statistical analysis of the 129 key-shaped formed unifaces comprising the prehistoric study sample also indicates high frequencies for items produced from chalcedonies (60.5%) and cherts (27.9%). Together they constitute 88.4% of the tools in the study sample, whereas basalt tools include only 11.6%. This is highly conspicuous and significant since basalt usually comprises between 70% and 90% of tools and debitage in most assemblages on the Canadian Plateau. There was clearly a strong selective preference for using cryptorystalline silicates to manufacture key-shaped formed unifaces, presumably to effectively satisfy needs relating to tool efficiency, reliability, and maintainability (see Chapters 3.3, 3.5 and 3.6). This raw material predilection might not be so obvious for sites on the Columbia Plateau where good quality basalts are usually rare, and silicate tools and debitage typically constitute large proportions of most assemblages.

Evidence for thermal alteration was observed on 27.1% of the specimens in the study sample (Appendix 3). Of these, 85.7% are chalcedony and 15.3% are chert. Chalcedony tools are slightly more than twice as common than chert specimens (68.4% and 31.6% respectively). If the relative incidence of thermal alteration was more or less similar for both these lithic material categories, the expected proportion of thermally altered chalcedony items vs. thermally altered chert specimens should be about 2.16 to 1, or 24 and 11 items respectively, but actual frequencies are 30 and 5 respectively.

The relative frequencies of thermally altered chalcedony and chert specimens reveal that chalcedony flake blanks used to make key-shaped formed unifaces were about three times more likely to have been thermally altered than those of chert. The reason for this disparity is probably due to the fact that most "raw" (i.e., unaltered) chalcedonies usually display a high incidence of internal groundmass flawing, they are less abundant than most types of cherts, and on average, cobbles and chunks of chalcedony tend to be smaller. Given that the hardness and durability properties inherent in most chalcedonies were considered to be optimally suited for satisying functional and technological demands associated with the use and maintenence of key-shaped formed unifaces, thermal treatment would have partially rectified problems relating to internal flawing, scarcity, and small core size. Experimental thermal treatment of silicates has shown that it can often significantly improve the potential to reliably produce large flake blanks and enhance overall flakability by annealing internal flawing. In some instances it may have also increased edge sharpness (see Chapter 3.3.3). Alternately, it appears that most cherts were considered to be suitable for producing key-shaped formed unifaces in an unaltered state, probably because the incidence of flawing is generally less frequent for this material type category, and large cores from which suitable flake blanks could be derived were more abundant.

About 45.0% of the specimens in the study sample can be assigned to either of three late prehistoric cultural horizons defined by Richards and Rousseau (1987) through absolute and/or relative dating methods. Of the items with known age affiliation, 15.5% belong to the Shuswap horizon (ca. 3500 to 2400 BP), 82.7% relate to the Plateau horizon (ca. 2400 to 1200 BP), and only 1.7% date to the Kamloops horizon (ca. 1200 to 200 BP).

At present, the number of excavated Shuswap horizon components ($n \simeq 25$) is slightly less than half the number of investigated Plateau horizon components ($n \simeq 60$), and about a third the number of investigated Kamloops horizon components ($n \simeq 75$) (see Richards and Rousseau 1987:Tables 1-3). A sampling bias is strongly suspected with respect to the relative proportions of components representing each of these three horizons, particularly with regard to Shuswap horizon occupations.

The number of excavated Shuswap horizon components relative to the numbers of excavated components belonging to the following Plateau and Kamloops horizons is most certainly underrepresented with respect to the true (i.e., actual) proportions of components belonging to each of these horizons on the Canadian Plateau. There appears to be at least two important reasons for this situation. First, because Shuswap horizon non-housepit lithic scatter components are usually more deeply buried than those dating to the later Plateau and Kamloops horizons, they have been more difficult to detect during site surveys, and consequently have escaped being investigated.

Second, many Shuswap horizon pithouse villages were established in locations that were also favoured by people participating in the following two horizons. Numerous housepit site investigations indicate that aboriginal reconstruction and reoccupation of abandoned house depressions was a common practice that often involved removal of unwanted floor deposits from previous occupations and/or enlargement of a house depression. Both these activities resulted in earlier artifactual materials being redeposited outside the house floors onto the surrounding house rims (see Blake 1974; Fladmark 1982:123; Hayden *et al* 1986,1987). Therefore, as a general rule, most investigations of housepit floors indicate that they usually contain evidence of the last, or most recent occupation(s). Since the majority of investigations conducted at multicomponent pithouse villages have focussed primarily on sampling house floor deposits, and not house rims, materials belonging to earlier occupations (e.g., a Shuswap horizon component) have often been missed, or are significantly underrepresented in excavated assemblages.

Considering the abovementioned factors, it is really not surprising that very few sites dating between ca. 3500 and 2400 BP have been identified or investigated on the Canadian Plateau. I suspect that once a larger sample of Shuswap horizon sites are examined, -- particularly non-winter residential base camps -- it will probably be revealed that key-shaped formed unifaces are more commonly represented in components belonging to this period than is suggested by the results of the present study.

The very high frequency (82.7%) of study sample specimens assigned to the Plateau horizon (ca. 2400 to 1200 BP) indicates that key-shaped formed unifaces were used quite regularly during this period. Despite the apparent sampling problems perceived to be associated with investigation of Shuswap horizon components, I suggest that in general, these tools were probably used more frequently during the Plateau horizon than during the Shuswap horizon. However, a larger sample of Shuswap horizon components would be required to adequately assess the veracity of this postulate.

Interestingly, the high frequency of key-shaped formed unifaces represented in Plateau horizon components corresponds with a period when logistical subsistence practices were significantly intensified relative to the previous Shuswap horizon (Chapter 3.6; Lawhead, Stryd and Curtin 1986:31-32; Richards and Rousseau 1987:56-57). That curated technologies were often engaged to increase resource procurement and processing efficiency and to mitigate problems associated with scheduling stress and raw material shortages, it seems logical that key-shaped formed unifaces (and other task-specific curated tools), would have been more commonly used during this time.

Only one specimen in the study sample was recovered from a context belonging to the Kamloops horizon (ca. 1200 to 200 BP). It is associated with a radiocarbon age and diagnostic artifacts that place it solidly within the first 200 years of this horizon (Table 2). The apparent absence of this tool type between ca. 1000 to 200 BP is considered highly significant given the exceptionally large number of excavated Kamloops horizon components. A ca. 1000 BP termination date is also indicated for the Columbia Plateau and Arctic (see Chapter 4.2 and Table 2). A suspected primary reason for discontinued use of this tool type at about this time is offered in Chapter 10.

When the 129 study sample specimens are laid ventral face down with their projections oriented distally, 89.1% have the concave margin on their left side, and 10.9% have it on their right. Right-handed persons typically comprise

88% to 90% of any contemporary population, whereas left-handed people make up the other 10% to 12% (Bakan, pers. comm. 1987). Assuming that key-shaped formed unifaces were always used with the hand of preference, as they were in the experimental component of this study (Chapter 7), it follows that right-handed aboriginal people used tools with concave margins on the left side of the tool, and for left-handed people it was on the right. This proportionality again supports the conclusion that the concave margin was the primary functional edge of key-shaped formed unifaces, and that it was engaged primarily by drawing it toward the user.

Residue deposits derived from contact materials were observed adhering to the surfaces of 28.7% of the study sample specimens. These residues had survived for one to three millennia (Chapter 5.3). The actual number of tools initially bearing residue deposits may have been greater, but depositional conditions and the common practice of thoroughly washing lithic artifacts prior to analysis may have resulted in removing them from many specimens.

Although sample sizes of key-shaped formed unifaces from five of the ten archaeological regions on the Canadian Plateau are too small to be statistically reliable or significant (Appendix 4), a preliminary inter-regional comparison of selected characteristics was undertaken for regional samples with greater than ten specimens. These regions include the Chilcotin (n=12 items), Mid-Fraser (n=16), South Thompson - Shuswap (n=42), South Okanagan (n=11), and Arrow Lakes (n=30).

Relative percentages of the three main lithic raw material type categories (chalcedony, chert, basalt) represented in these five regional samples suggests that approximate proportional similarity exists between the Mid-Fraser and Chilcotin regions where chalcedony constitutes about 75-80% of the specimens, chert 6-8%, and basalt 12-17%. This is not surprising since both regions are geographically juxtaposed, and they share similar geologic and physical environments. Chalcedony is also the dominant (57%) raw material in the Arrow Lakes sample, whereas chert comprises 40%, and basalt 3%. This pattern probably reflects a greater local availability of chalcedonies relative to cherts. For the South Thompson - Shuswap region, most of the specimens (ca. 45%) are made of chert, 33% are chalcedony, and 22% are basalt. This likely indicates that cherts are slightly more naturally abundant than chalcedonies in this region. The greater proportion of basalt tools compared to other regional samples is not entirely surprising, since there is an abundance of good quality basalts in the nearby Arrowstone Hills, and basalts almost invariably comprise about 80% to 90% of all lithic assemblages in this region. Chalcedony is the dominant (91%) lithic material type category represented in the South Okanagan regional sample, and basalts comprise the remaining 9%. Here, a regional scarcity of good quality cherts is suggested. Generally, the proportions of lithic raw material type categories repesented in these five regional samples again emphasize the preferential exploitation of local cryptocrystalline silicates over more abundant and readily available basalts, and also reflects the relative local natural abundance and availability of chaledonies and cherts.

The Chilcotin regional sample indicates that about 50% of its specimens have been made from thermally altered flake blanks, the Mid-Fraser region sample indicates 25%, South Thompson - Shuswap 10%, South Okanagan 36%,and the Arrow Lakes 24%. Thermal alteration of silicates may have been more commonly practiced in the Chilcotin region than in the Mid-Fraser River region, since both regional samples have similar raw material type category proportions (see above). The very low incidence of thermal alteration indicated for the South Thompson Shuswap region specimens is likely owing to greater local availability of cherts, since collective analysis of the 129 study sample specimens indicates that chalcedony tools are about three times more likely to have been thermally altered than those produced from cherts (see above). The percentages of thermally altered specimens from the South Okanagan and adjacent Arrow Lakes are somewhat similar, and not unexpectedly, these samples both contain relatively high proportions of chalcedony tools. In sum, lithic material thermal alteration practices appear to have been most common in regions where abundance and availability of chalcedonies dominate that of cherts.

All of the key-shaped formed unifaces with known age affiliation in the Chilcotin and South Okanagan regional samples belong to the Plateau horizon (ca. 2400 to 1200 BP). For the Mid-Fraser region 4% are from Shuswap horizon (ca. 3500 to 1200 BP) contexts, 82% belong to the Plateau horizon, and the remaining 4% date to the early Kamloops horizon (ca. 1200 to 1000 BP). For the South Thompson - Shuswap regional sample, 8% are affiliated with the Shuswap horizon, and 92% belong to the Plateau horizon. The high frequency of these tools in Plateau horizon contexts in these regions is commensurate with the expected pattern determined for the 129 study sample specimens (see above). About 60% of the Arrow Lakes region sample specimens date to the Shuswap horizon, and the remaining 40% relate to the Plateau horzion. This pattern is attributed to sampling bias, since most of the excavated components from which the Arrow Lakes specimens were drawn date to the Shuswap horizon.

Inferential Analysis

Results of the Pearson Product-Moment correlation coefficient analysis for selected pairs of continuous variables represented in the 129 study sample specimens produced fairly predictable results (Table 11). Moderately strong positive correlations are indicated for the relationship between margin edge angles and their respective spine-plane angles. This is not surprising, since both measures are sometimes the same measurement, or usually differ only slightly from each other.

Moderately strong positive correlations are also evident between the maximum tool length and maximum width, and between maximum tool width and proximal margin length. Moderately weak positive correlations are noted between: (1) maximum tool length and maximum thickness; (2) maximum tool length and projection medial width; (3) maximum tool width and maximum tool thickness; and (4) concave margin curvature depth and concave margin length. Again, these general relationships are expected. They simply reflect typical dimensional attributes of a flake blank and aspects related to overall formal tool design.

9.4 Microwear Sub-sample Statistical Analysis Results

Descriptive and inferential statistics were also calculated to provide a comparative basis for microwear traces observed on the 35 prehistoric microwear sub-sample specimens with those exhibited on the eight experimental tools used to work green wood (Chapters 6, 7 and 8; Appendices 5 and 6; Tables 5 to 13).

Descriptive Analysis

Standard measures of central tendency and dispersion for discrete and continuous variables represented in the 35 prehistoric microwear sub-sample specimens and eight woodworking tools are presented in Tables 5 to 10. Their mean and variance values are considered to provide a "normative" account of recurrent attribute patternings related directly to the design of key-shaped formed unifaces, and to the predominant use-behaviours associated with their prehistoric use.

Frequencies and relative percentages of discrete nominal and ordinal scale variables are presented in Appendix 6. The most frequently represented attribute variables (i.e., highest percentages) are also taken to be strongly indicative of, and related to, the basic design of key-shaped formed unifaces and the most commonly executed use-behaviours associated with them. A summary of the descriptive statistical analysis results and comparison of the prehistoric microwear sub-sample with the replicated experimental tools has already been presented and discussed in Chapters 6 to 8, and thus need not be repeated here.

Inferential Analysis

Pearson product-moment correlation coefficients calculated for selected pairs of continuous and discrete variables observed on the 35 prehistoric microwear sub-sample items are presented in Table 12. The results indicate that there is very little or no significant correlation between most of the paired variables. This indicates that microwear trace patterns incurred on various parts of the tools often vary within and between specimens comprising the prehistoric microwear sub-sample. Nevertheless, a weak positive correlation is indicated between the concave margin mean microflake size and the "opposite" margin mean microflake size. This is likely due to both of these margins having been used on the same or similar contact materials with comparable levels of applied force.

For selected ordinal scale variables represented in the prehistoric microwear sub-sample, Spearman's rank-order correlation coefficients (Table 13) indicate moderately strong positive correlations between: (1) distal projection edge rounding intensity and distal tip polish intensity; (2) concave margin edge rounding intensity and concave margin polish intensity; and (3) "opposite" margin microflake scar frequency and "opposite" margin crushing intensity. Not surprisingly, these correlation results indicate that an increase in edge rounding on the distal projection tip and concave margin is quite often associated with a concomitant increase in polish intensity. Also, an increase in "opposite" margin microflake scar frequency is quite often associated with an increase in crushing intensity.

Moderately weak positive correlations are indicated between: (1) edge rounding intensities on the distal projection tip and concave margin; (2) polish intensities on the distal projection tip and concave margin; (3) concave margin edge rounding intensity and "opposite" margin edge rounding intensity; (4) concave margin microflake scar frequency and concave margin crushing intensity; (5) "opposite" margin rounding intensity and "opposite" margin polish intensity; (6) ventral face polish intensity and ventral face striation intensity; and (7) ventral face striation intensity and ventral face rounding intensity.

In general, the Spearman rank-order correlation coefficient results suggest that: (1) increases in edge rounding and polishing on the projection tip are often associated with corresponding increases of the same on the concave margin, supporting the conjecture that these two morphological features played a related and important role in the primary function of key-shaped formed unifaces; (2) an increase in edge rounding is often associated with an increase in edge polish on the distal projection tip, concave, and "opposite" margins; (3) an increase in microflake scar frequency often corresponds with an increase in edge crushing for the concave margin; and (4) an increase in ventral face striation intensity is often accompanied by an increase in ventral face polish and rounding intensity. Most of these correlations were self-evident during the microwear analyses (Chapters 6 and 8), and they are compatible with generalized patterns of various recurrent microwear trace associations observed by many previous researchers.

A moderately weak negative correlation is indicated between the concave margin mean edge angle and the concave margin edge rounding intensity. This suggests that as the concave margin edge angle increases, the edge rounding intensity decreases. This makes logical sense since an obtuse edge is much stronger and therefore less prone to being damaged or dulled under duress than an invasive edge (see also Wilmsen 1970; Hayden and Kamminga 1973; Cantwell 1979). Given that key-shaped formed unifaces were designed in an attempt to strike a optimal balance between functional efficiency, reliability, and longevity, it comes as no suprise that steep concave margin edge angles are a prominent and recurrent feature of these tools.

9.5 Experimental Tool Statistical Analysis

The eight experimental tools (E.T.'s #1- #6, #8 and #10), used to strip bark and work green wood, were analyzed collectively as a sub-sample. They were subjected to the same descriptive statistical analyses of microwear trace variables conducted for the 35 prehistoric microwear sub-sample specimens (Appendix 6; Table 6, 9 and 10). Detailed results of this comparative analysis are presented in Chapter 8, and thus are not repeated here. Meaningful inferential statistics could not be calculated for the eight woodworking tools because of small sample size.

A judgemental comparison of the descriptive statistical results generated for the eight woodworking tools and the prehistoric microwear sub-sample specimens suggests that microwear traces exhibited on both sample sets are quite similar, and the hypothesis that prehistoric key-shaped formed unifaces functioned primarily as woodworking tools was accepted. The few salient disparities displayed between the sample sets were potentially attributed to: (1) small sample size, (2) use of soft and/or brittle lithic raw materials to make the experimental tools; (3) that prehistorically, seasoned wood was very likely sometimes worked using this tool type, whereas the eight experimental tools used to generate the statistical analysis results were used exclusively on significantly softer green woods; and (4) that prehistoric tools may have been occasionally used in a secondary capacity to also work soaked or boiled antler.