A study into the classification of North American projectile points revealed that traditional theoretical approaches, while useful in their own right, may also conceal a vast amount of technological diversity within the archaeological record. The dart-arrow dichotomy, often perceived as a simple transition from larger to smaller points based upon the static object, benefits from a closer look at the scientific variables involved in projectile point use. The archery-based experiment detailed below attempted to do just that, using point weight and effective trajectory as primary markers for projectile performance, the results of which might be used to suggest the presence of a more complex transitional phase from dart-and-atlatl to bow-and-arrow technology than previously thought.

**Background**

**Traditional approaches:**
- These range from simple subjective observations of size, to increasingly complex multiple attribute analyses, each concerned with the static object
- Concerned with sorting the data into neat bimodal categories, thereby elevating the importance of distinct metric parameters and classification accuracy rates
- Often obscure technological diversity behind a façade of supposedly clear-cut functional types

Yet, as the active testing of these types has shown, functionally bimodal distinctions are far from clear.

**The experimental approach:**
- Uses a basic understanding of the science behind projectile aerodynamics to place the object in its likely functional context
- Important classificatory attributes, in this case point weight, are justified by observations of actual projectile performance

In this study, the following hypothesis is explored:

*The use of lighter arrow points with the bow produces a flatter trajectory, and hence greater accuracy than dart points traditionally used with the atlatl, which are typically heavier and tend to travel in an increasingly arched trajectory.*

This allows for the measurement of functional overlap between types, which can be used to question the validity of previously dualistic approaches to classification.

**Methods**

Due to the vast diversity of point types within prehistoric North America, it was considered most viable to select just one for the preliminary case study, the Southwest, before application on an inter-regional scale.

- Dart and arrow point weight averages were derived from selected site samples, providing a guide for replicated points to be harled and tested
- Interestingly, several of the dart and arrow weights derived from the sample overlapped, providing a good basis upon which to create a third ‘intermediate’ category for testing
- The projectiles were shot from the same bow, which was secured in a workbench to ensure consistency for the measure of trajectory
- The target used was made of foam, and each regional shot marked accordingly before being removed
- Each was shot four times, resulting in a total of 48 shots at target, with no misses

**Results**

Composing Data:
- A grid format was applied to the foam target to record the hits and convert them into computerised diagrams
- When all shots at target were combined into one diagram, substantial overlap was clearly present between dart, arrow and, particularly ‘intermediate’ groupings.

[Figure 1: Projectile point attributes]

**Conclusions:**
- Whilst the general trend seen here supports the notion stated in the hypothesis, the ‘intermediate’ specimens, commonly overlooked in traditionally deterministic approaches, reveal a more complex distribution
- Based on the preliminary performance tests, these points could be regarded as ‘multi-purpose’, suitable for use with either weapon. Arguably then, these points have much to tell us about periods of technological transition.
- By exposing the true diversity of the dart-to-arrow continuum, the results might also be related to tool use-life and reworking so that standardised projectile point weights and, hence, definitive classification parameters might be considered unrealistic when attempting to define the technologies and activities of past peoples.

**Future work**

The results derived from this preliminary study have raised several questions about both the bimodal tendencies of traditional approaches to dart and arrow classification, and the potential of the experimental approach for understanding diversity during periods of technological transition. Following further refinement, the next logical step would be to apply the methodology to other regions within North America, for comparison on an inter-regional scale. Effectively, this could provide a useful method by which to track the spread of the bow and arrow across the continent, each regional transition comparable by rate of change, gradual or abrupt, and the extent of continued and complimentary use of the dart and atlatl.

**Key References**