

## Heads and Tails: The informational value of Greek coinage and its evolution (650–336 BCE)

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Graphic identifiers are images used to distinguish items in a population. They fulfil that purpose best when one unique identifier denotes each class of items. However, cultural diffusion prevents this: cultural items such as first names, national flags or heraldry spread through the population and get imitated (Bentley et al., 2004; Morin and Miton, submitted). Their informational value as identifiers subsequently diminishes.

In this study we tested three predictions about informational value of Ancient Greek coin designs. The main purpose of a coin design is to signal the coin's issuing authority and value (denomination) (Kraay, 1976). However, early coin designs were not always successful in communicating this information equally well. The intensive communication and trade between Ancient Greek city-states from the 6<sup>th</sup> to the 4<sup>th</sup> century BCE facilitated the diffusion of coins throughout the Greek world (Schaps, 2014). We expected coin designs to become less informative about their issuing authority with time, and to become more informative about their denomination. We also expected the designs to be more informative about the lower denominations: the production of small coins was prone to errors, for which the designs could be used to compensate (Bresson, 2006).

We measured the informational value of coin designs using conditional entropy (Shannon, 1948). The results show that coin designs do become more informative about the denominations with time, but they also become more informative about the authorities. One possible cause for this trend is that coin designs became more differentiated through time, without becoming more organized to reflect authorities or denominations. Contrary to what we expected, the coin designs seem to be more informative about higher denominations than the lower ones. We attribute this to the fact that value discrepancies are more important between higher denominations than between lower denominations, leading to a pressure to identify high-value coins.

### References

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