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We present a number of results surrounding Caselli's conjecture on the equidistribution of the major index with sign over the two subsets of permutations of  $[n]$  containing respectively the word  $1 \dots k$  and the word  $(n - k + 1) \dots n$  as a subsequence. We derive broader bijective results on permutations containing varied subsequences. As a consequence, we obtain the signed mahonian identities on families of restricted permutations, in the spirit of a well-known formula of Gessel and Simion, covering Caselli's conjecture. We also derive an extension of the insertion lemma of Haglund, Loehr, and Remmel which allow us to obtain a signed enumerator of the major-index increments resulting from the insertion of a pair of consecutive elements in any place of a given permutation. Applications on linear extensions of posets and twisted pattern avoiding permutations are also discussed. (Received January 22, 2019)