The time-course of biological phenomena – illustrated with the London Marathon

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**Supplementary Material 1**

**Statistical properties of the distribution**

The cumulative distribution function (*cdf*) is defined by

 (1)

where ,  and  are specified parameters. By convention, *r* cannot be less than zero or greater than one because the function would be complex-valued, which makes no biological sense.

The probability density function is the derivative of *F*(*x*; *r*,*c*,*t*)

 (2)

The *n*th raw moment is given by

 (3)

Therefore, the mean and variance are, respectively,

 (4)

and

 (5)

The skewness and (excess) kurtosis are, respectively,

 (6)

and

 (7)

There are no simplifications for the median, the mode and entropy, which are, respectively,

the unique *k* such that  (8)

the unique solution to  (9)

and  (10)