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All you need is some Friends to brighten up your day!

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Abstract

This paper is based on the popular comedy TV show *Friends* and aims to work out how much laughter is exercised in whole a series. This is used to work out how much energy is used for a person to laugh constantly at that amount of time. Thereafter using this amount of energy, it is calculated how many standard 100 W LED light bulbs can be powered for one minute using that energy. The key findings of this paper are that the approximate total amount of laughing in a whole *Friends* series is 1207 minutes, where 1520.82 calories based on that laughter can increase heart rate up to 20% from rest level [1]. This amount of energy is equivalent to lighting up a standard 100 W LED light bulb, assuming all the energy is used to light up the bulb.

Introduction

This paper is based on the American television sitcom, *Friends* that is created by David Crane and Marta Kauffmann. This show lasted for 10 seasons, totalling a number 236 episodes that aired from September 22th, 1994 to May 6th, 2004 [2]. The show revolves around a group of six friends in their 20/30s, that live in New York. For 10 years, this group of friends go through mayhem, fights, romances, laughs, tears and surprises, as they learn what it means to be a friend [3].

In each episode there are moments where the audience laughs, every instance where something funny occurs. The length of audience laughter at each instance is recorded, and the total is collated for the whole series. This is converted to quantify how many calories would be burnt. It is then calculated how many standard 100 W LED light bulbs can be powered for a minute using this amount of energy. The purpose of this paper is to find out how much laughter is needed to brighten up your mood.

Calculations

In a 25-minute episode there is approximately 5.11 minutes (307 s) of audience laughter, that was quantified using one episode, Season 6 Episode 02 [4]. Due to timing restrictions it was assumed that all 236 episodes had approximately 5.11 minutes' worth of laughter in each episode. By making this

assumption, the total audience laughter in the series is a duration of 1207 minutes (72,452 s).

In order to calculate the energy expenditure, the metabolic equivalent to the task (*MET*) is used. *MET* is what is used to measure the intensity and energy expenditure, E_{cal} , in calories of activities that can be compared to a person's weight:

$$E_{cal} = 0.0175 \times MET \times w \times \Delta T. \quad (1)$$

Equation 1 uses the weight, w , measured in kg, *MET*, activity and the duration, ΔT , measured in minutes, in order to calculate the energy expenditure of laughing [5]. It is suggested that laughter increases heart rate up to 20%, above resting level ($MET = 1$), therefore *MET* for laughter is suggested to be 1.2 [1]. An average weight of 60 kg is taken and the duration is the total amount of laughter at 72,452 s. This produces a value of 1520.82 calories (cal) burnt, if a person was laughing constantly for 1207 minutes continuously.

To calculate the amount of energy needed to light up 100 W bulbs, the calories are converted into joules. 1 cal is equal to 4.1868 joules (J), which means that 1520.82 cal is equivalent to 6363.11 J.

$$P = \frac{E_{joule}}{t}, \quad (2)$$

where power, P , is measured in watts (W), energy, E_{joules} , in joules (J) and time, t , is measured in seconds (s). Equation 2 converts the energy into power, to light a bulb for 1 minute (60 s), this gives a value of 106 W. This means one 100 W bulb can be lit up to 1 minute, if it is assumed all the energy is used to light up the bulb.

Discussion

Laughter is known to have many possible health benefits, that can reduce muscle tension, increase oxygenation of blood, exercising of the heart and production of endorphins. It is suggested that laughter causes elevated heart rate and increase muscle movements. Therefore, can cause an increase in energy expenditure [1].

Laughing can occur in response to a humorous stimulus and seems to occur more in a social context [6]. There are many instances in the *Friends* episodes that this occurs. Every instance was timed which lasted from 1-5 s. It would not be necessarily true that every person that watches *Friends*, finds every instance humorous and that also lasts for a set duration. However, in the context of this paper it is assumed that the timing of audience's laughter whilst

watching the TV show, *Friends*, is at the same duration as the laughter track.

The paper assumes that the total amount of laughter in a whole series, is laughed constantly, however in real life this is not possible. The calculations show that 1207 minutes of laughter is needed to produce enough energy needed to light up at least one 100 W bulbs. Laughter does not use much energy, but there are positive physiological and psychological outcomes associated with laughter [7].

Conclusion

It is concluded that laughing doesn't use much energy and to light up at least one standard 100 W LED light bulb, a significant amount of laughter is needed. In the whole season there is approximately 1207 minutes of laughter, and in total 1520.82 calories are burnt. This is equivalent to 6363.11 J which can power one bulb for 1 minute, if all the energy is used to light up the bulb.

References

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