

Usability of Different Types of Commercial Selfie Sticks



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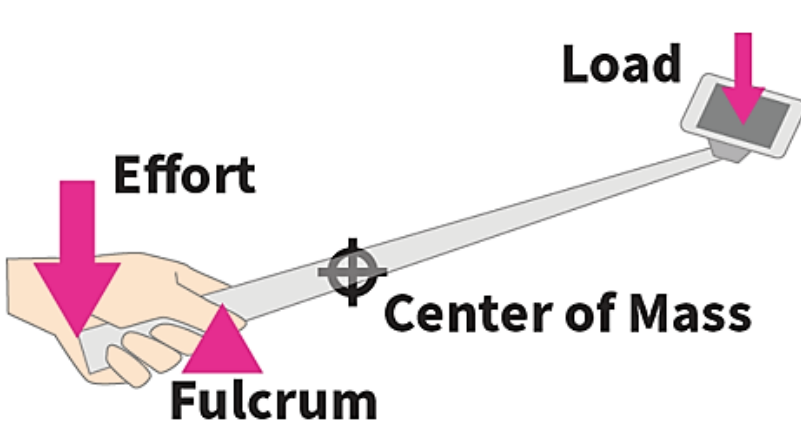


Selfie Sticks

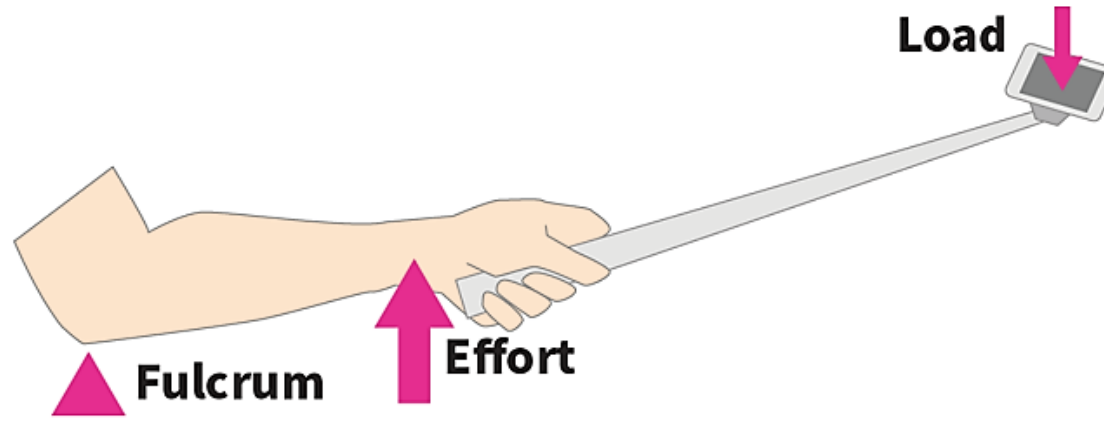
- Becoming increasingly popular
 - 95% of U.S. 18-34 year-olds have taken a selfie
 - 27% have used a selfie stick
- Often physically demanding
 - Carrying around a camera attached monopod
 - Adjusting the angle
 - Balancing the rod with one hand for an intended view
- Human factors must be considered
 - No research on usability of commercial selfie sticks



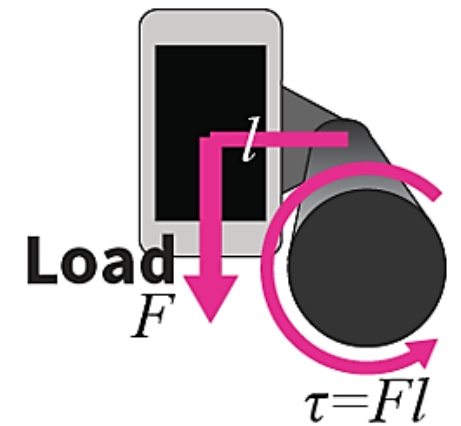
Physiological Challenges



A second-class lever



A third-class lever



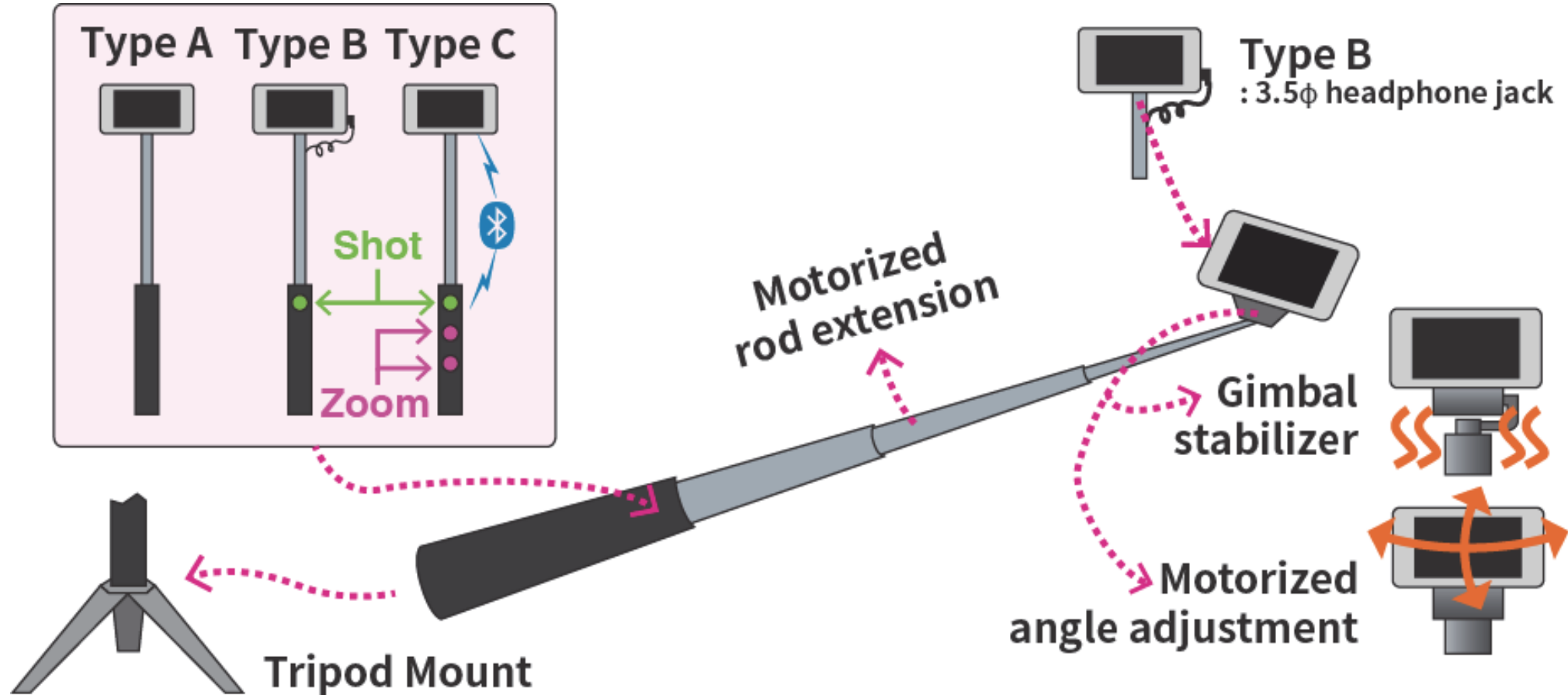
A portrait orientation grip
(i.e., when the smartphone is in a portrait position)

Commercial Selfie Sticks

- Informal survey of Alibaba, Amazon, eBay
 - Collected all items listed as “selfie stick”
 - Divided then into “inexpensive”, “affordable”, “expensive” price ranges
 - Based on the cheapest and the priciest items on the list
 - Picked the 10 most sold items from each price range
- 3 main types of selfie sticks

| Category | Shutter Control | Advance Camera Control | Body Material | Handle/Grip | | Phone Holder | | Diameter <i>cm</i> | Mirror | Length | | Joints | Weight <i>g</i> | Max. Load <i>g</i> | Available Accessories |
|-----------------------------|--------------------------------------|------------------------|-----------------------------------|--------------------|-----------------------------------------------------|--------------|--------------|-----------------------|--------|---------------------|-----------------------|--------|--------------------|-----------------------|------------------------------------------|
| | | | | Width <i>cm</i> | Material | Clamp | Lock | | | Folded <i>cm</i> | Extended <i>cm</i> | | | | |
| <i>Type A:</i> Timer | Camera Timer | No | Stainless steel or aluminum alloy | 2-5 | Foam, plastic, or matte rubber-based anti-skid grip | Adjustable | silicon grip | 2-3 | No | 13-23 | 50-110 | 5-7 | 45-181 | 500-1000 | GoPro accessories and custom camera apps |
| <i>Type B:</i> Wired | 3.5mm headphone audio/auxiliary jack | Rarely | | 2-5 | | | | 2-4 | Rarely | 13-25 | 50-110 | | 45-136 | 500-1000 | None |
| <i>Type C:</i> Bluetooth | Bluetooth 3.0 or above | Mostly | | 3-5 | | | | 2-4 | Rarely | 18-50 | 76-125 | | 130-300 | 500-1000 | Tripod and remote control |

Commercial Selfie Sticks: Results



A Survey

- Voluntary participants recruited from social media (twitter, facebook)
- A semi-structured questionnaire
 - Demographic
 - Selfie stick usage (type, frequency of use, etc.)
 - Subjective opinion (pros, cons, considerations, etc.)
 - Ergonomics (fatigue-related questions)

Result: Participants demographics



96% South Korean



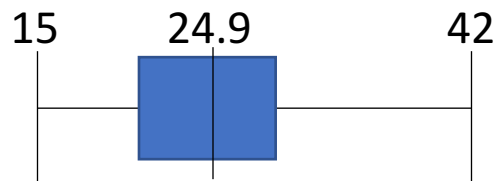
105

8

105 out of 113 have used a selfie stick

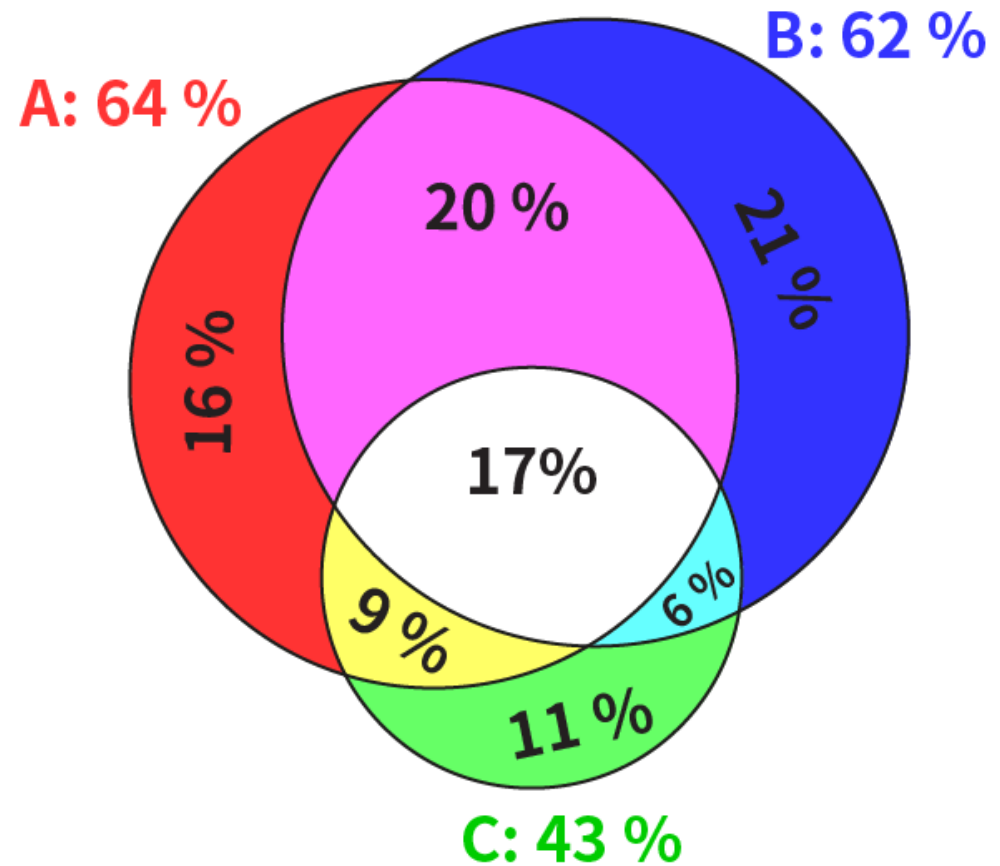
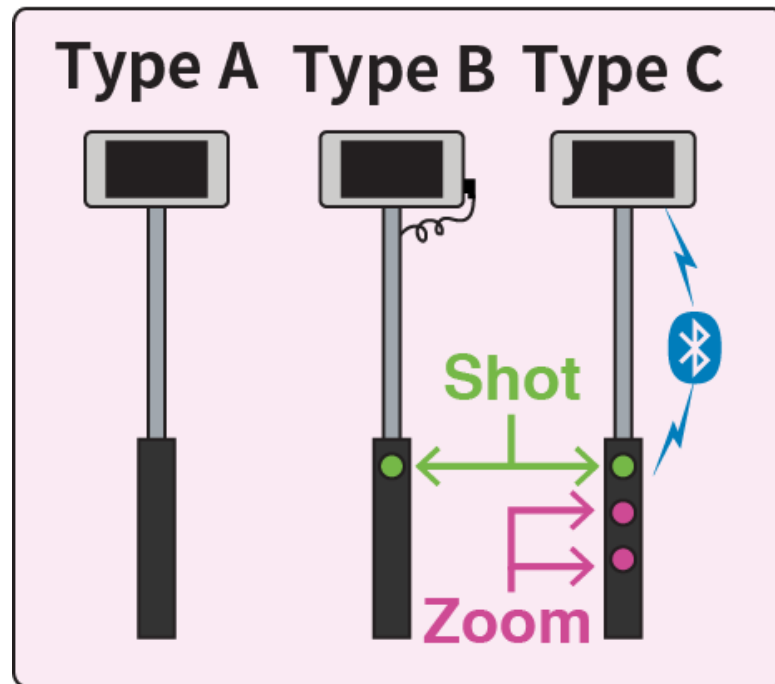


Female: 37 % | Male: 63 %



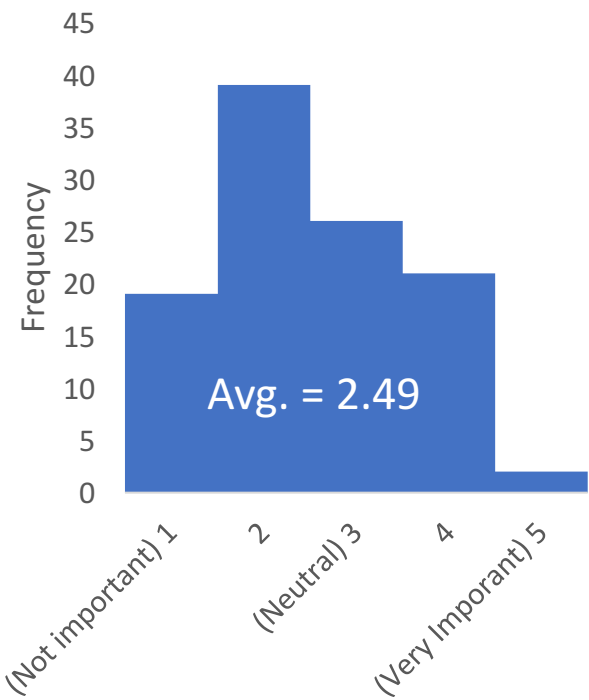
Avg. 24.9 years old (SD=4.4)

Result: type of selfie stick usage



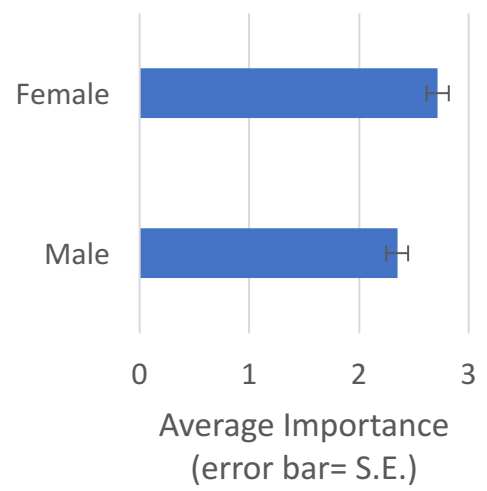
Result: importance

Q: How important is your selfie stick to you as a gadget? (1: less important / 5: most important)



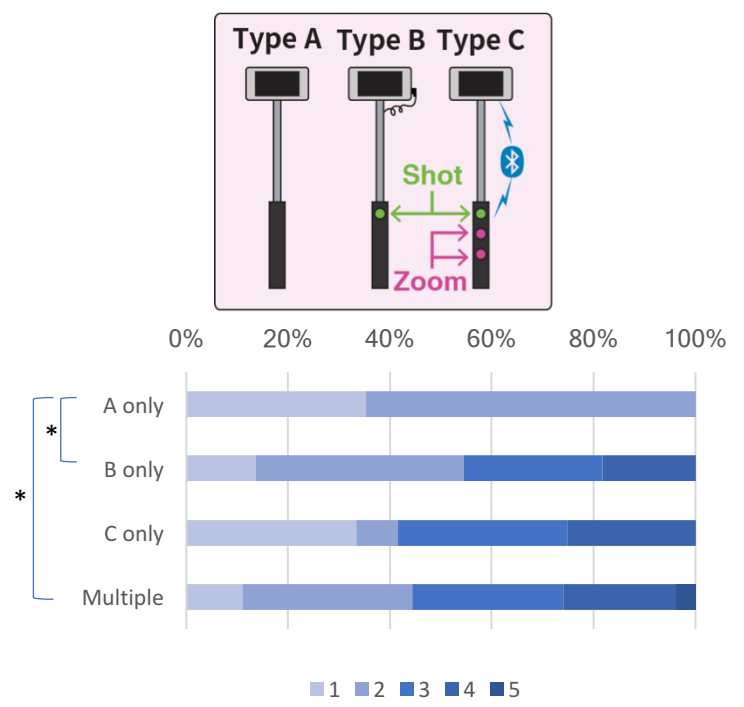
People think selfie stick is **not an important** gadget.

* Gender vs. importance



Female tends to think a selfie stick **more important** than male (marginal, p=.09)

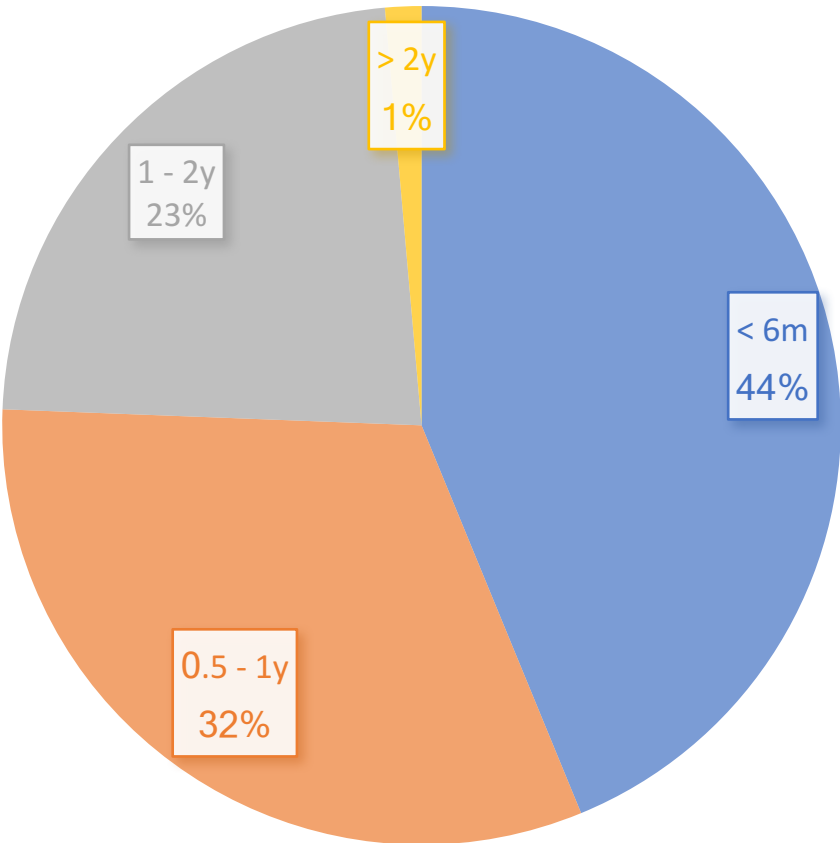
* Stick type vs. importance



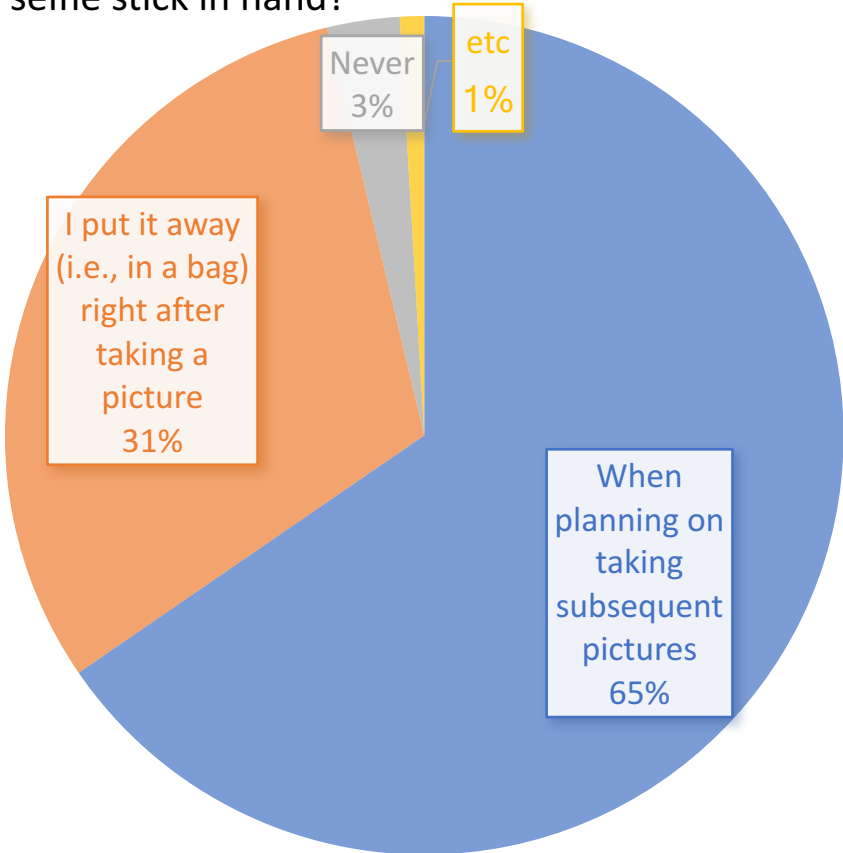
Those who buy **cheaper** sticks (A type) think a selfie stick **less important**

Result: usage pattern

Q: How long have (or had) you used your selfie stick(s)?



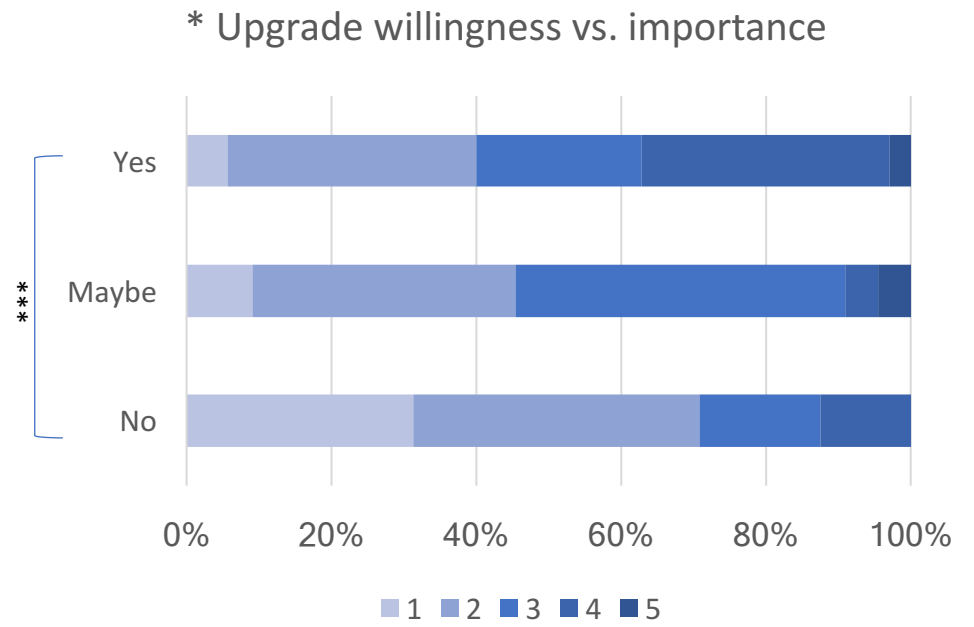
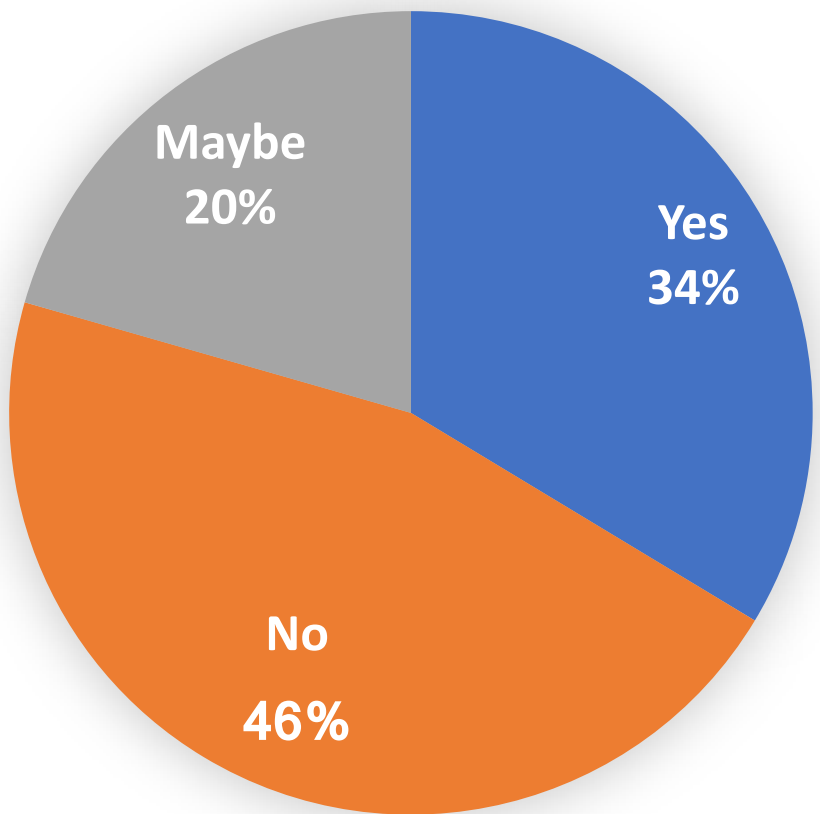
Q: When you carry your selfie stick, how often do you carry your selfie stick in hand?



* : p < 0.05
** : p < 0.01
*** : p < 0.001

Result: upgrade willingness

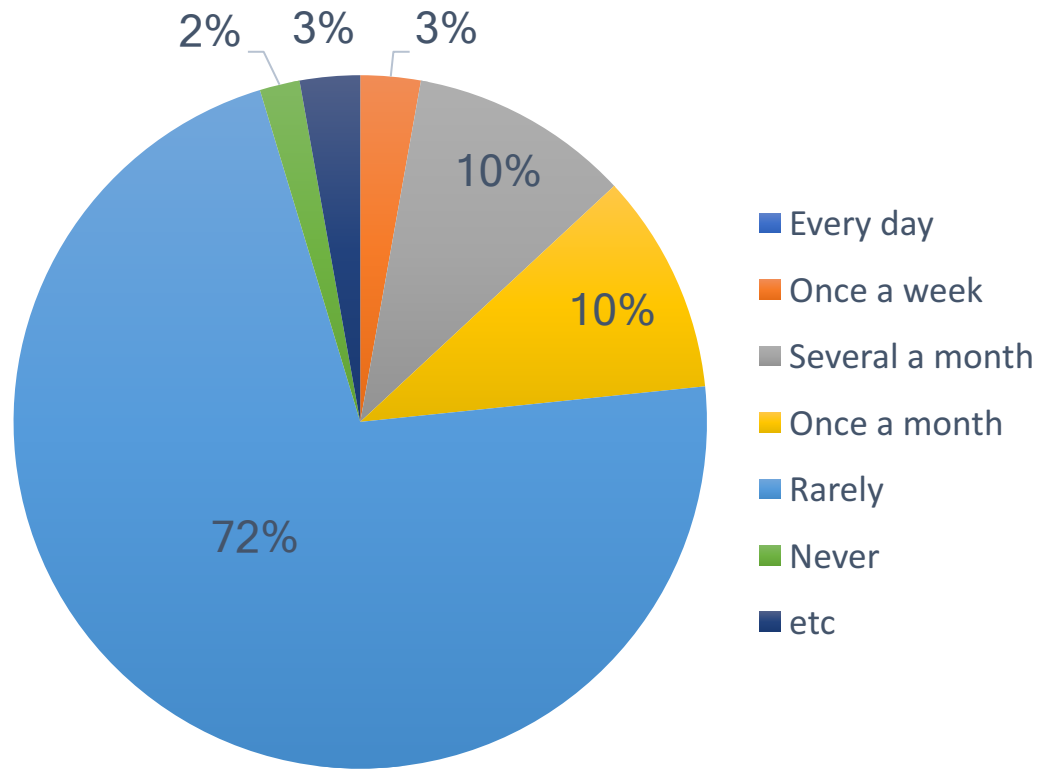
Q: Would you like to upgrade to a better selfie stick?



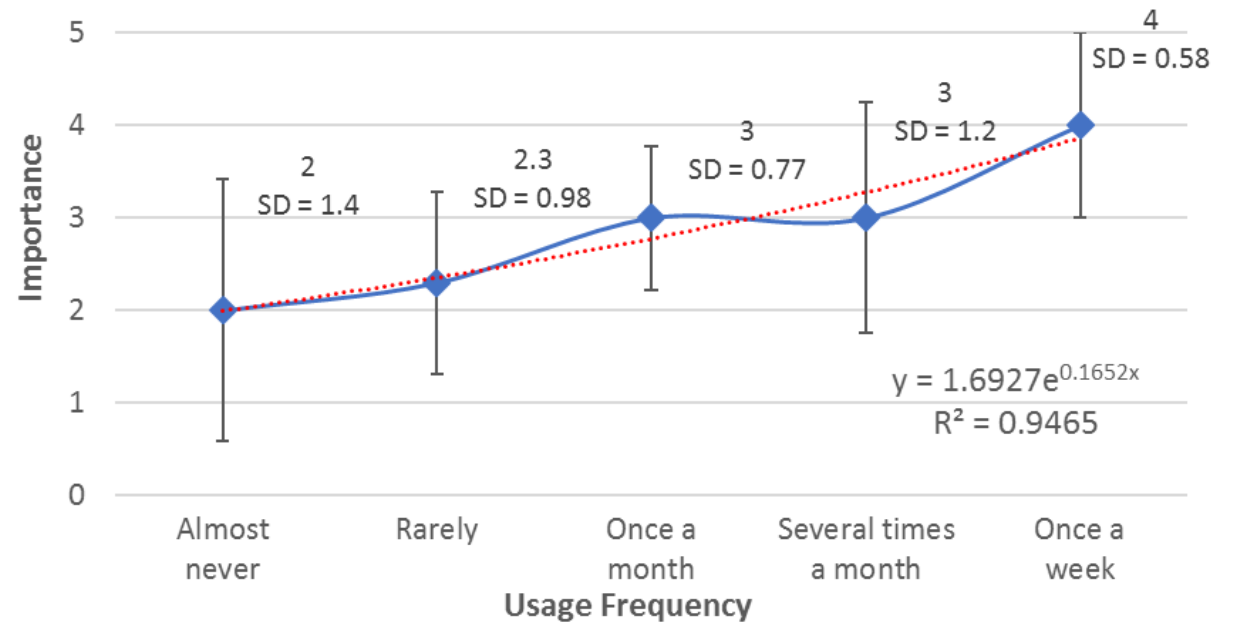
There are **more** demands for upgrading a selfie stick as they think their selfie sticks more important.

Result: usage frequency

Q: How frequently do you use your selfie stick?



* Usage frequency vs. importance

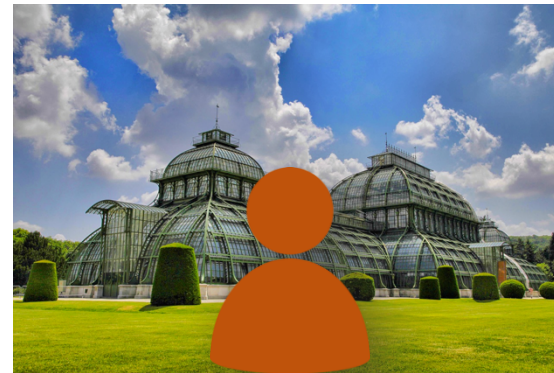
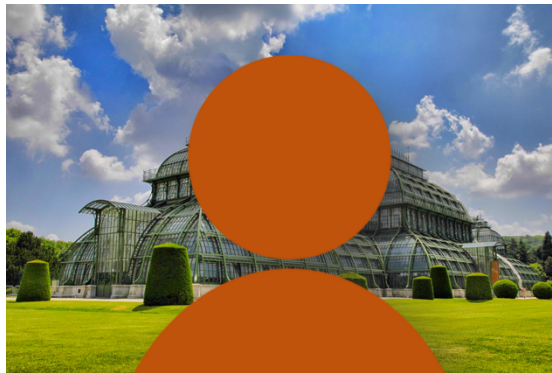


*Perceived importance of the devices
increase with usage frequency*

Subjective question: liked

Q: What do you like the most about your selfie stick?

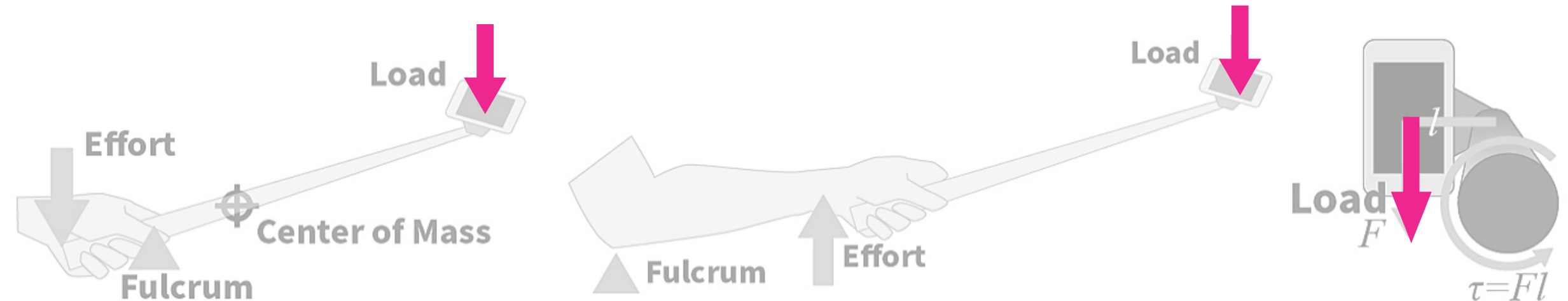
1. **Ability to take pictures and videos with wider backgrounds and landscapes (68.6%),**
2. Ability to take self-portraits without the assistance of the others (27.6%),
3. Ability to take group pictures with ease (26.7 %)
4. Ability to enhance the composition and aesthetics (21%).



Subjective question: disliked

Q: What do you hate the most about your selfie stick?

1. **The devices are heavy and bulky (55.2%),**
2. The preparation involved with using a selfie stick, such as mounting the phone and expanding the rod (12.4%)
3. The devices are not durable (9.5%)
The rod is often conspicuous to others (9.5%)
The fear of accidentally dropping the smartphone or camera (9.5%).



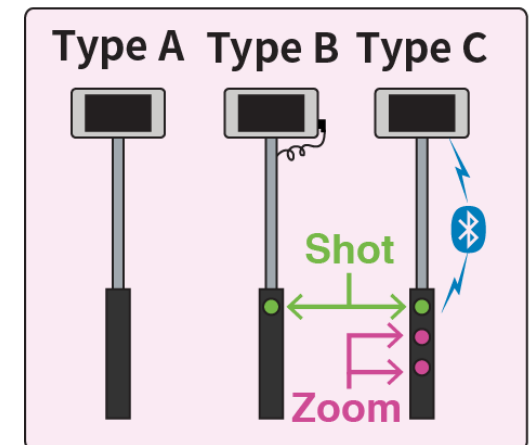
Subjective question: desired improvement

Q: If you could change one thing about your selfie stick, what would it be?

1. **Volume and weight, i.e., would make them smaller, thinner, and lighter (36 %)**
2. *Holder design*, i.e., more durable and firm holder (12.4 %)
3. *Connection method*, i.e., $A \rightarrow B$, $B \rightarrow C$, $C \rightarrow B$ (12.4 %)
4. More *Durable* stick (9.5 %)
5. Longer rod length (5.7 %)
6. Better (shake-resistant) button (5.7 %)

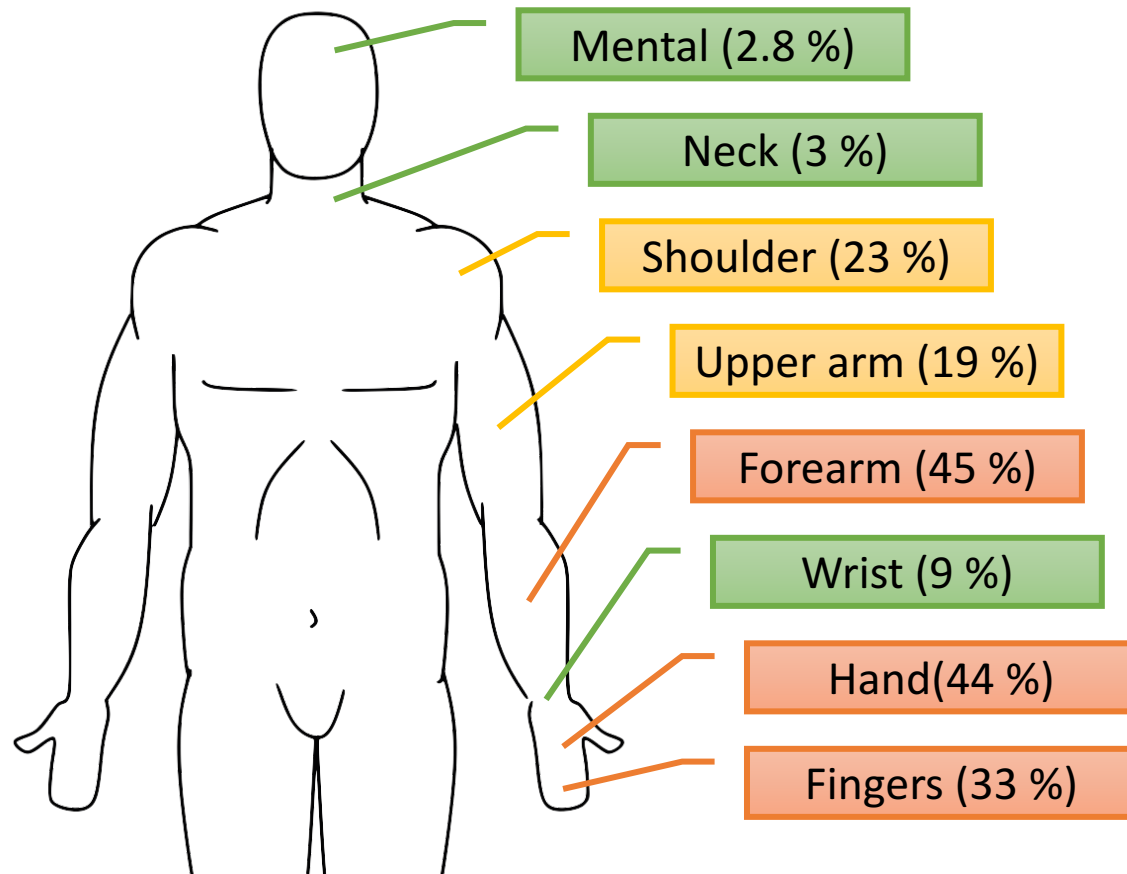
Q: What is the 'one' thing you would consider in your next selfie stick purchase?

1. Price (27.6 %)
2. Portability (21.9 %)
3. Durability (21 %)
4. Solid holder (18.1 %)
5. Functionality (14.3 %)
6. Convenience, i.e., easy to press a shutter button (11.4 %)



Physical stress: fatigue

Q: Do you feel any discomfort using the selfie stick?

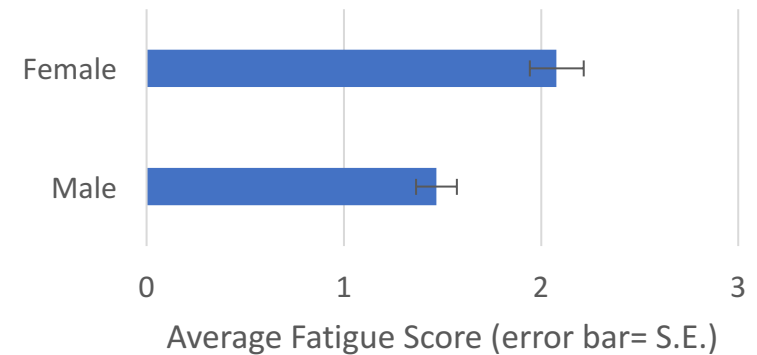


Fatigue score (FS)

$$= \sum (\text{Discomfort Body parts})$$

Effect of ...

- *Frequency on Fatigue*: n.s. ($p=.52$)
- *Gender on Fatigue*: marginal ($p=.052$)

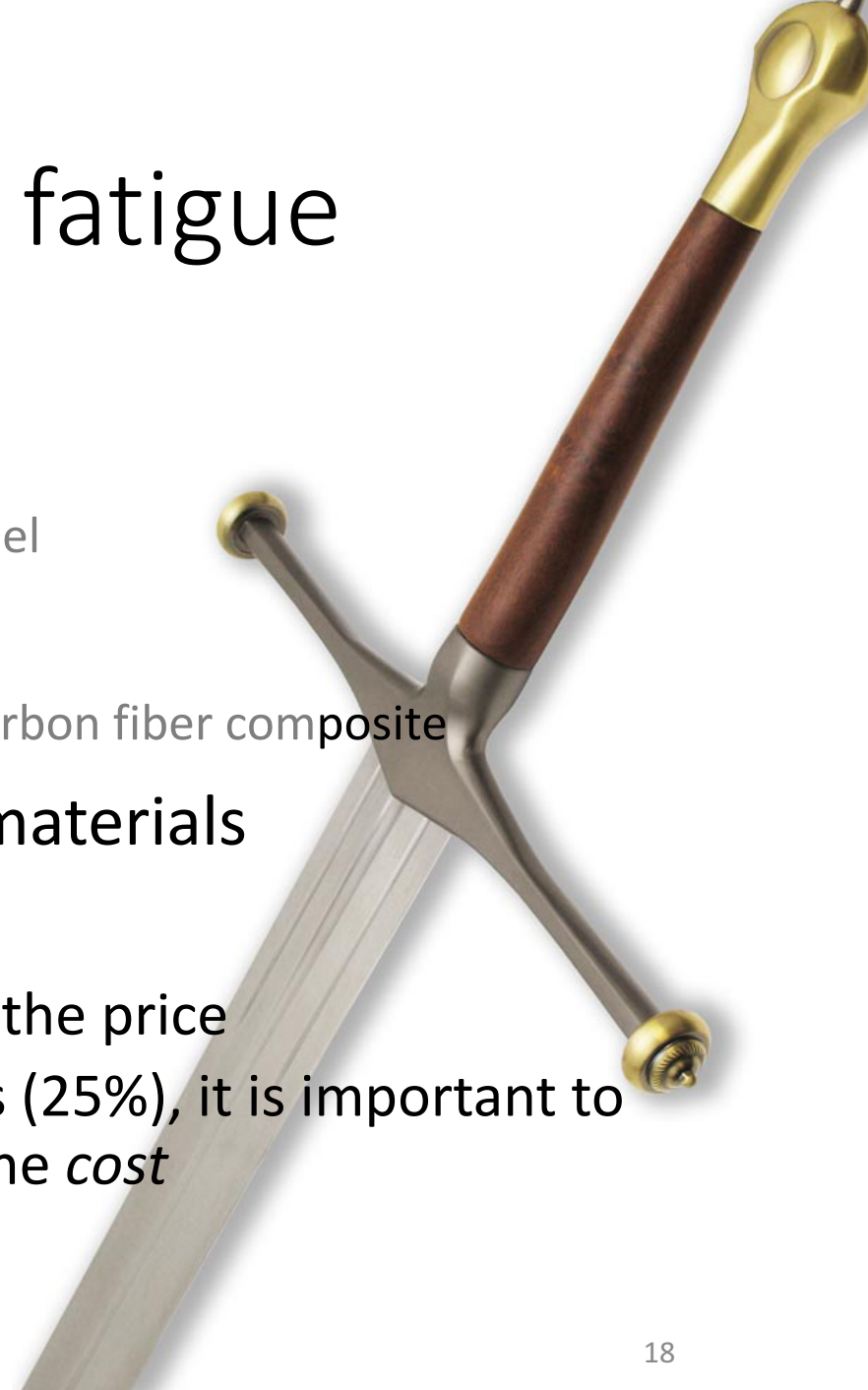


Summary

- Most used selfie sticks occasionally
- A *weak* relationship between *usage frequency* and *importance*
- Users that found selfie sticks *important*
 - On average *female* found more important than male (*not significant, p = .09*)
 - Are *likely* to upgrade to better/smarter selfie sticks
- Users that found selfie sticks *unimportant*
 - Settled for *cheaper* selfie sticks
 - Not interested in upgrades
- Caused short-term fatigue in all major arm and shoulder muscles
 - The extent *suggests*, could turn into *chronic* over the time and with extensive use
 - On average *female* reported 29% higher fatigue than male (*not significant, p = .052*)

Recommendations for reducing fatigue

- Use a shorter arm if possible
- Add counterweight to the handle, e.g. sword's pommel
 - May increase fatigue due to the third-class lever
- Use lightweight materials for the long rod, e.g., carbon fiber composite
- Use wide handle made/covered with anti-skid materials
- Automate repetitive features, e.g., angle adjustment
 - Requires additional hardware & sensors, increasing the price
 - Since affordability is one of the most desired factors (25%), it is important to maintain a balance between the *functionality* and the *cost*



Limitations & Future Work

- Fatigues were self-reported
- 96% participants were from the Republic of Korea
 - A future study will broaden participant pool
- Insufficient data to study effects of frequency & gender on fatigue
 - A future study will increase sample size
- Insufficient data to study long-term effects
 - 95% provided contact info for a future study to find out
 - If they continued using their selfie sticks
 - Upgraded/downgraded to different selfie sticks
 - Long-term effects of the selfie sticks
- Standardization of selfie stick (minimal requirements)

Raw data is now available!

- Find the anonymized result data at:

http://kuaa.net/publications/2017-SelfieStick-SurveyResult_release.csv
(or simply visit <http://kuaa.net>)

- We appreciate your additional analysis on the data.
- Thank you for listening!