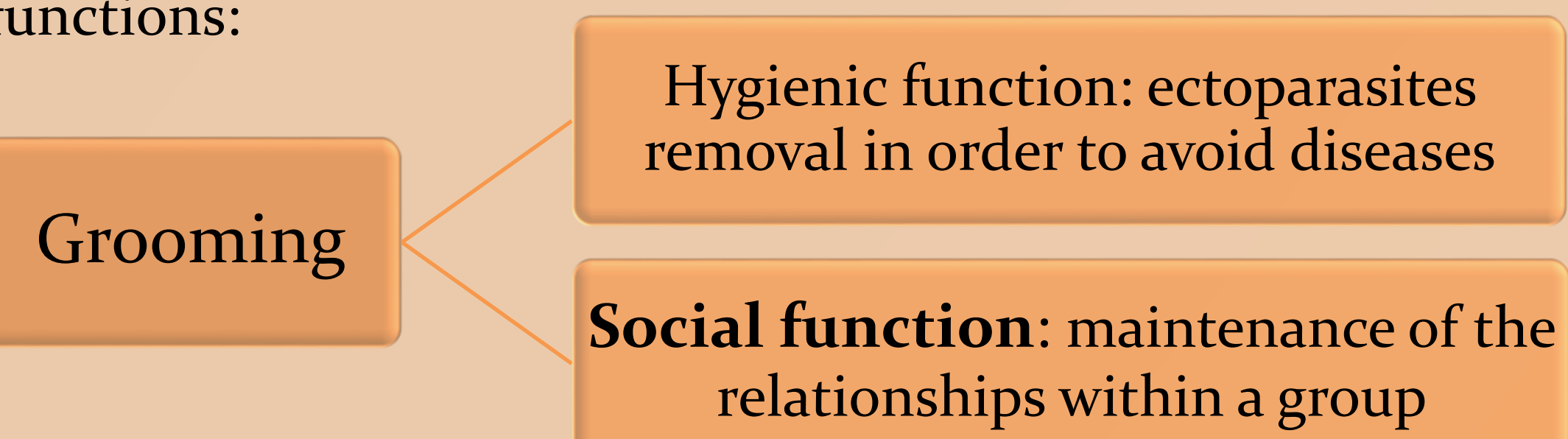# Grooming among Old World monkeys: a revision of its social role

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1. Theoretical background

Grooming is a common activity by which animals clean their fur in order to remove parasites, insects and dirt from themselves (autogrooming) or from others (**allogrooming**). Although it is observed in most primate groups, it varies both between species and gender, occurring mainly among **females of Old World monkey species**.

It has two main functions:

Grooming
- Hygienic function: ectoparasites removal in order to avoid diseases
- **Social function**: maintenance of the relationships within a group

3. Inter-group factors

❖ Group size

When the social role of grooming was only an assumption, some authors performed various experiments in order to prove it. There were tested two main hypothesis, which related the time spent grooming with **body weight** (first hypothesis) and with **group size** (second hypothesis) [1]:

1. If grooming only had a **hygienic function**, then the frequency of allogrooming should correlate with body weight because if there were more parts of the body exposed, there would be more need of grooming.

2. If grooming also had a **social function,** it should correlate with group size and not with body weight since primates would have to spend more time servicing the others in a larger group.
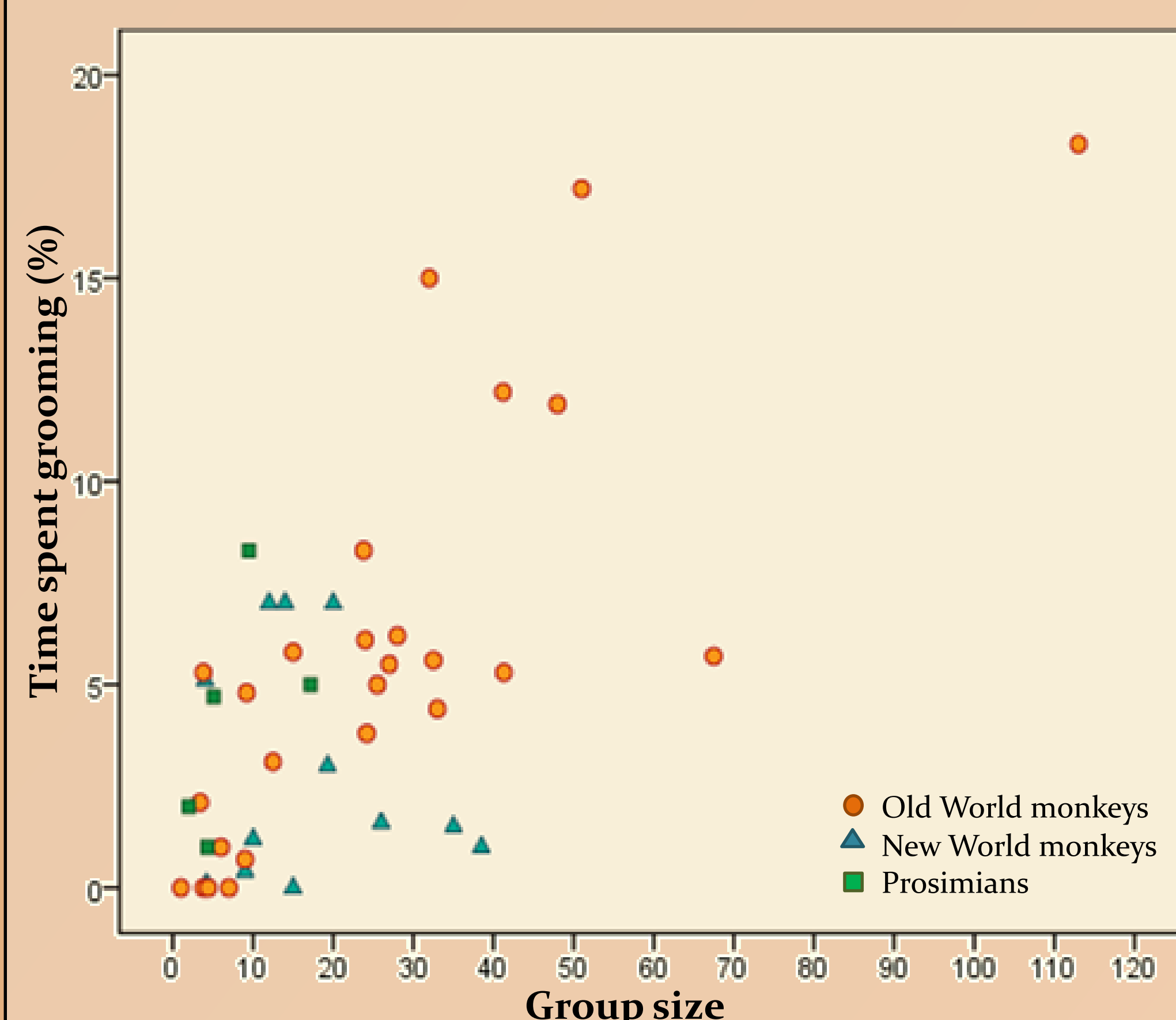

The results supported the second hypothesis, showing an increase of grooming when group size was bigger (Fig. 1).

It could be concluded that:

Old World monkeys spend **much more time engaged in grooming** than required for purely hygienic reasons.

Primates comprising large groups need mechanisms (such as social grooming) that enable them to **maintain the social structure and cohesion** of the group.

Fig. 1. Mean percentage of time spent grooming against group size. There is a better correlation among Old World monkeys than New world monkeys and Prosimians. Data from Dunbar (1991).

❖ Social Systems

There are three types of social organization among primates: solitary, pair-living and **group living species.** Social systems of group living species can also be divided into four groups, differing in the number of males and in the dispersion of females:

Group-living species
- Number of males
  - Single-male groups
  - Multi-male groups
- Dispersion of females
  - Female-resident groups
  - Female-transfer groups

Some authors tried to find out how the presence of males affected female behaviour and how it varied between different social organizations. To check it, they measured the degree of reciprocation of grooming among females, since it is a good way to test the positive relationships at the group level. The results were the following [2]:

1. There was a higher degree of grooming reciprocation among female resident species ➡ The bonds are tighter in those species that remain in the native group.

2. The reciprocation of grooming reduced with decreasing sex ratio among resident species ➡ Males represent a resource for which females compete.

3. There was more grooming reciprocation in single-male than in multi-male groups ➡ Competition among females is stronger in multi-male groups.

2. Aim and approach

The aim of this review is to provide an explanation of the different patterns of social grooming observed at a **global scale**, given mostly by inter-group differences in the group size and in the social systems and at a more **specific scale**, explaining the main factors that affect the distribution of grooming among individuals.

4. Intra-group factors

❖ Social rank, competition and coalition formation

The study of the factors affecting the distribution of grooming has been carried out over the years. There are two main models that try to explain the essential features of grooming networks among female monkeys:

Seyfarth's model

Females benefit from the interaction because of the removal of their ectoparasites and because there is a subsequent **support in an aggressive coalition**.

As it implies support in aggressive bouts, high-ranking animals are more attractive than low-ranking females since they can offer better coalitionary support, so females **compete for them**.

As a consequence of competition, females will only be able to **groom adjacently ranking females** (Fig. 2). Thus, the model predicts that grooming would tend to be directed up the hierarchy, but due to competition females would spend most of their time grooming individuals of adjacent rank [3].
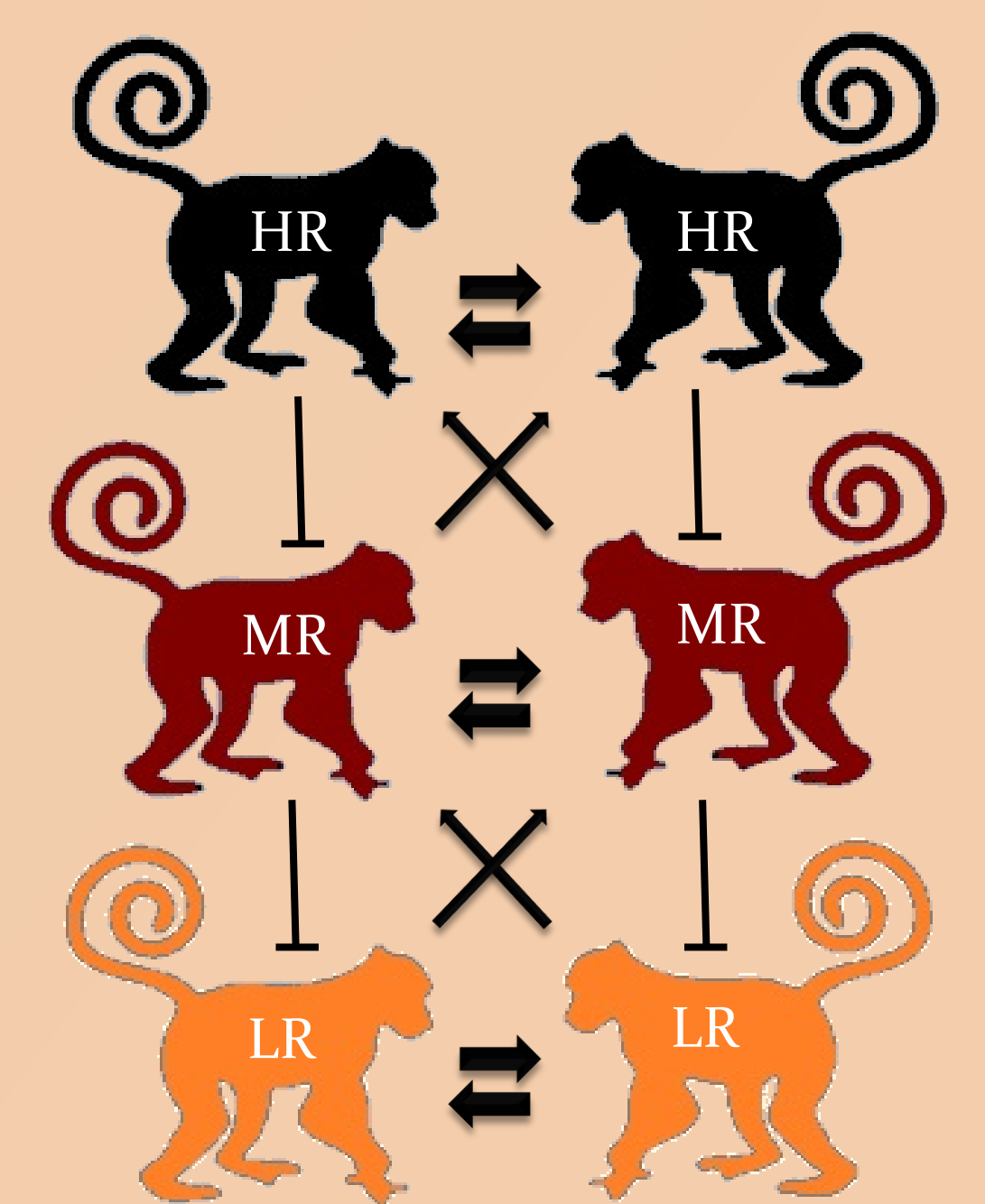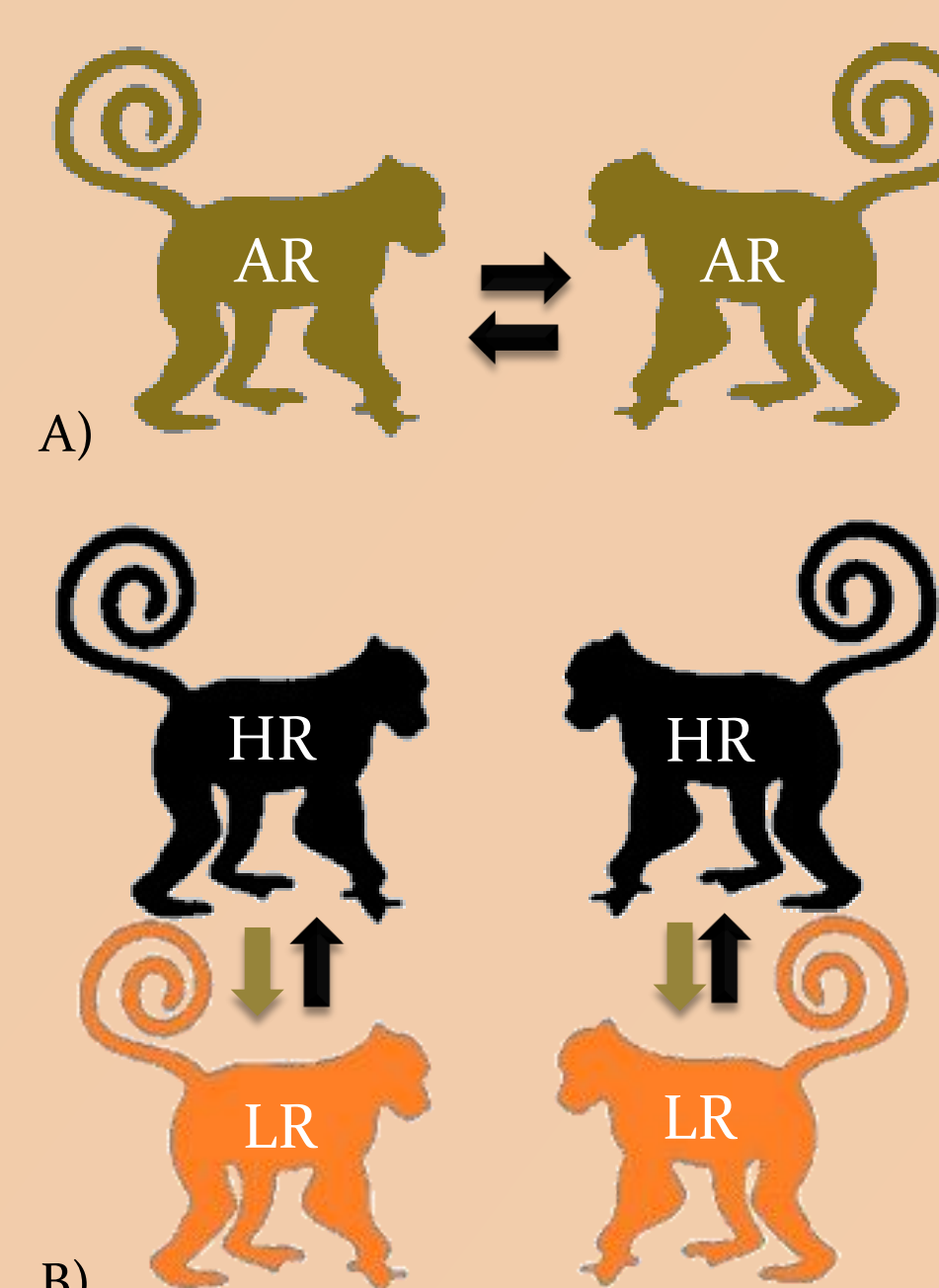

Fig. 2. Representation of Seyfarth's model. Individuals tend to groom adjacently ranking females because of competition.

Henzi & Barrett's model

Grooming is a currency that can be exchanged for more grooming or for other commodities depending on the degree of dominance (Fig. 3).
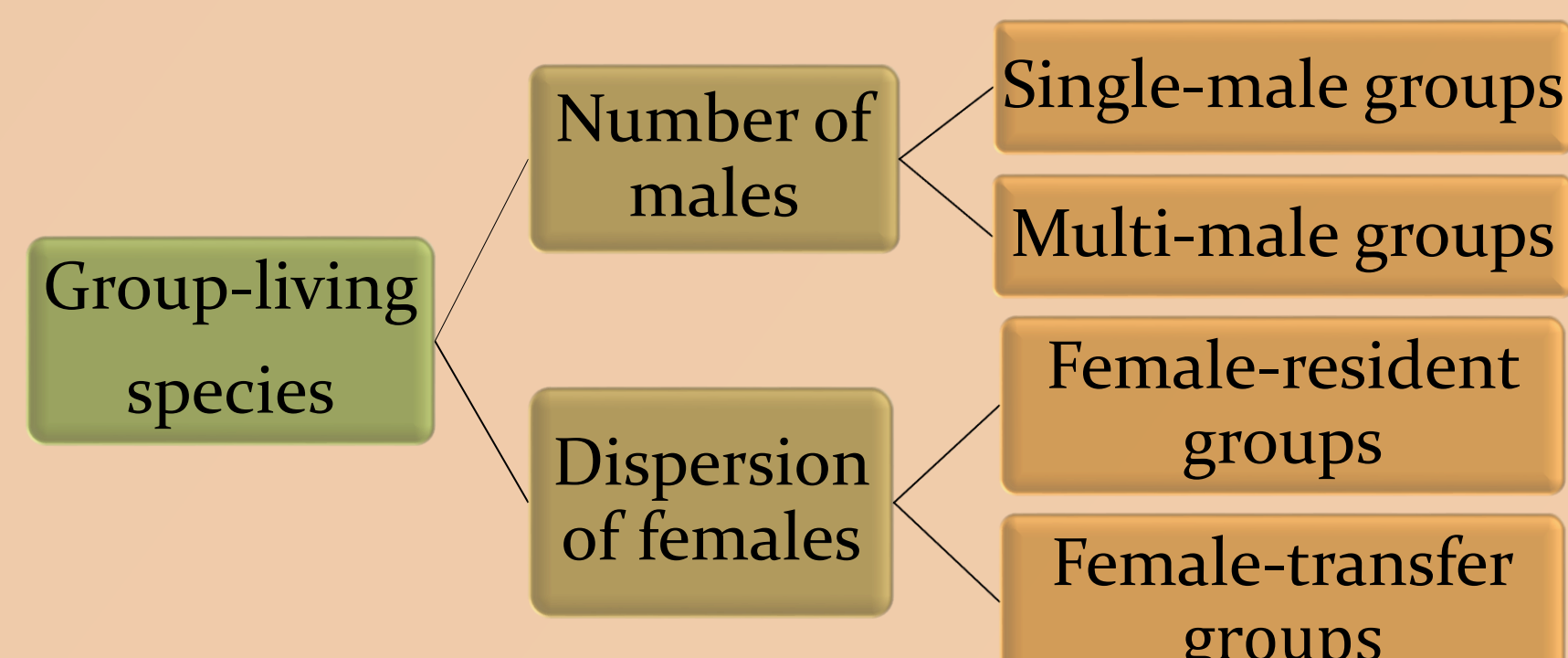
Low dominance hierarchy: individuals exchange grooming for more grooming (**reciprocal traders**).

High dominance hierarchy: low-ranking females groom high-ranking females in exchange for rank-related benefits, such as tolerance or coalitionary support (**interchange traders**) [4].

Fig. 3. Representation of Henzi & Barrett's model.   A) Reciprocal traders. B) Interchange traders. **HR**: high-ranking females; **MD**: middle-ranking females; **LR**: low-ranking females; **AR**: adjacently ranking females; ➡ Grooming; ⬇ Rank-related benefits; ⊣ Inhibition of grooming by competition.

5. Concluding remarks

Grooming is a common behaviour among primates that represents a mechanism necessary to ensure group cohesion, especially in those species that form larger and more complex troops where agonistic events are more usual. The same happens with female-resident societies, where grooming allows females to maximize the benefits of community living.

This behaviour is considered as a currency used by primate females to deal with different situations. In those groups where dominance among females is shallow, primates use grooming only as an exchange commodity, and it may serve as a way to remove parasites. Nevertheless, in those species with a great difference of powers, low-ranking females interchange grooming with high ranking females in order to receive different commodities, such as tolerance at feeding sites or coalitionary support.

Seyfarth's model can be considered a particular case of the model established by Henzi and Barrett, in which females of this model have a clear dominance hierarchy and they exchange grooming for coalitionary support.

6. References

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