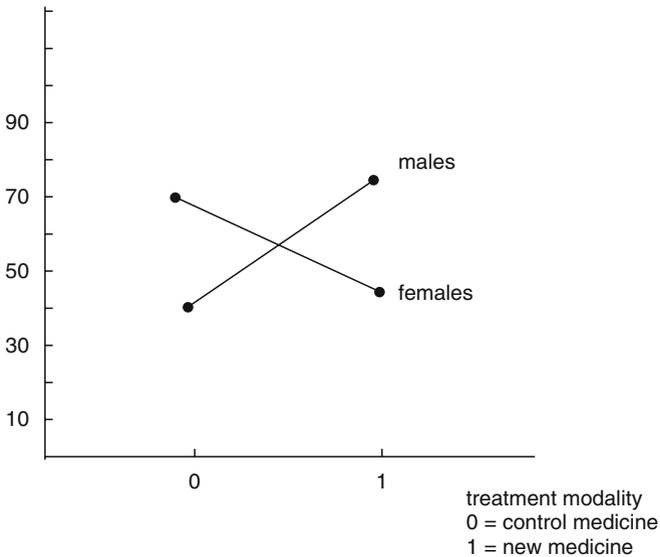


# Chapter 18

## Interaction



The medical concept of interaction is synonymous to the terms heterogeneity and synergism. Interaction must be distinguished from confounding. In a trial with interaction effects the parallel groups have similar characteristics. However, there are subsets of patients that have an unusually high or low response. The above figure gives an example of a study in which males seem to respond better to the treatment 1 than females. With confounding things are different. For whatever reason the randomization has failed, the parallel groups have asymmetric characteristics. E.g., in a placebo-controlled trial of two parallel-groups asymmetry of age may be a confounder. The control group is significantly older than the treatment group, and this can easily explain the treatment difference as demonstrated in the previous chapter.

### Example of Interaction

A parallel-group study of verapamil versus metoprolol for the treatment of paroxysmal atrial tachycardias. The numbers of episodes of paroxysmal atrial tachycardias per patient are the outcome variable.

	Verapamil	Metoprolol	
Males	52	28	
	48	35	
	43	34	
	50	32	
	43	34	
	44	27	
	46	31	
	46	27	
	43	29	
	<u>49</u>	<u>25</u>	
464	302	766	
Females	38	43	
	42	34	
	42	33	
	35	42	
	33	41	
	38	37	
	39	37	
	34	40	
	33	36	
	<u>34</u>	<u>35</u>	
368	378	746	
832	680		

Overall metoprolol seems to perform better. However, this is only true only for one subgroup (males).

	Males	Females
Mean <sub>verapamil</sub> (SD)	46.4 (3.23866)	36.8 (3.489667)
Mean <sub>metoprolol</sub> (SD)	<u>30.2 (3.48966)</u> –	<u>37.8 (3.489667)</u> –
Difference means (SE)	16.2 (1.50554)	–1.0 (1.5606)
Difference between males and females	17.2 (2.166)	

$$t - \text{value} = 17.2 / 2.166 = 8...$$

$$p < 0.0001$$

There is a significant difference between the males and females, and, thus, a significant interaction between gender and treat-efficacy. Interaction can also be assessed with analysis of variance and regression modeling. These two methods are the methods of choice in case you expect more than a single interaction in your data. They should be carried out on a computer.