The basic reproductive number

Chapter 3

Exercise 1

1a. Like many games, the Infection Detective becomes more and more difficult. Play the Infection Detective and investigate which factors are important in keeping the infection under control.

Fill in the table as you play.

Game level	Number of people (approximately).	Number of days until the vaccine is found.
Example	*41 people*	*20 days*
Level 1		
Level 2		
Level 3		
Level 4		
Level 5		

1b. Write down the factors you consider to be of importance in keeping the infection under control.

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1c. How would it affect the the disease control in real life if the number of people in one place were increased or if the time the disease was spreading were increased?

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R = 1   R = 2
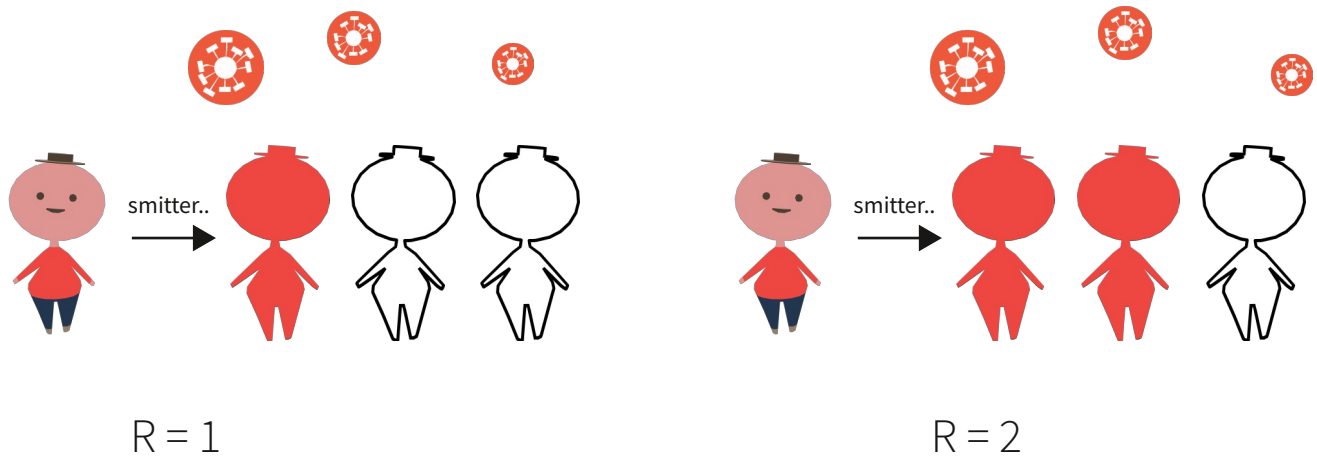
T What is the basic reproductive number?

In addtion to the number of people and the time the disease is spreading, the spread of infection also depends on the basic reproductive number.

The basic reproductive number is abbreviated R and indicates how many contacts one infected person infects on average.

For example, if the basic reproductive number is 2, it means that one infected person on average infects two others. There will therefore be three infected in total in the first cycle of infection. This is shown in the figure above. In the second cycle of infection the newly infected infect four new people, who will infect eight others etc.

Exercise 2

2a. Do you think the basic reproductive number is the same in all levels of the game? Substantiate your answer.
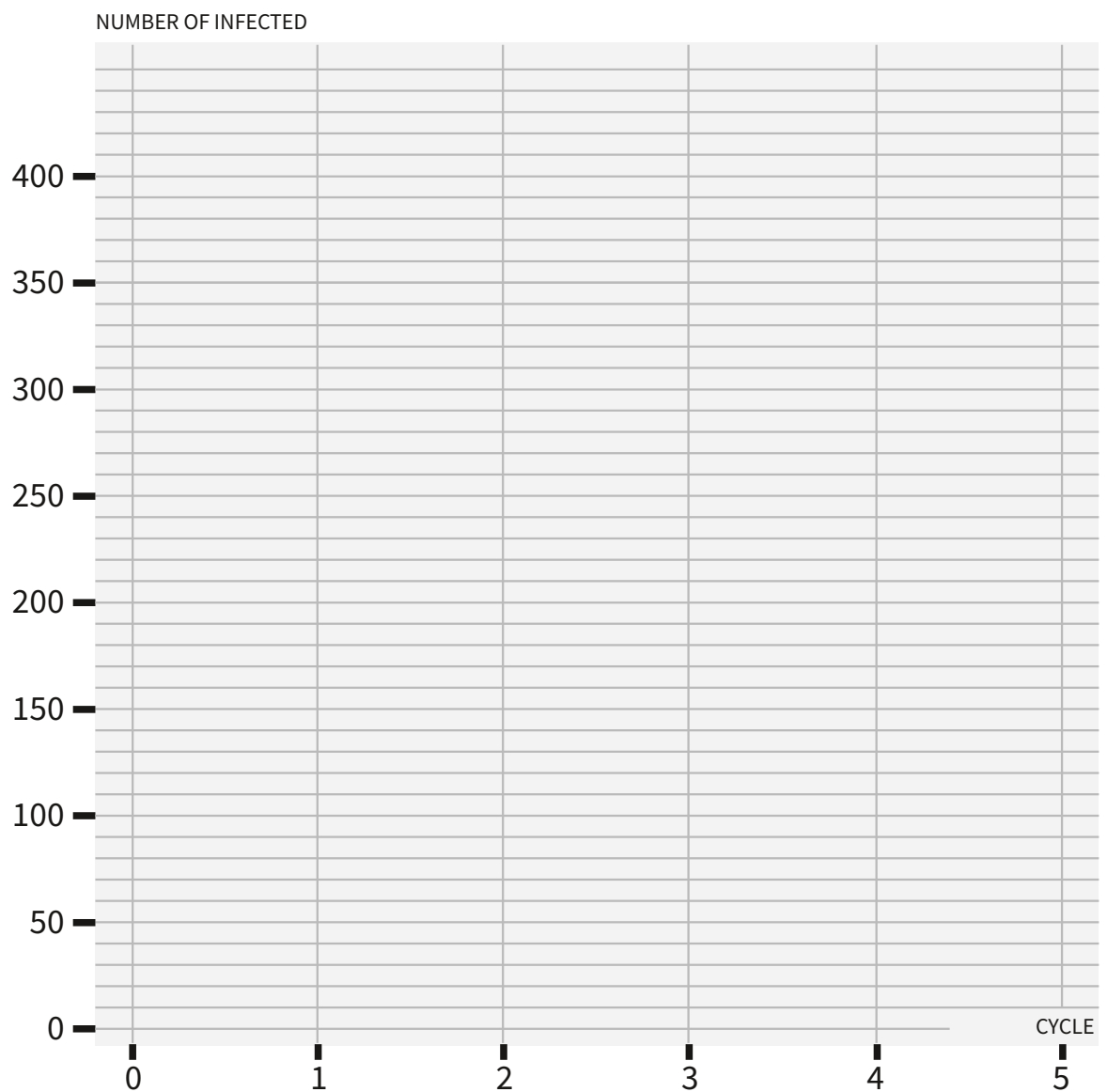
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2b. When a disease is spreading it is crucial whether the basic reproductive number is above or below 1. Why? Fill in the table.

Cycle	R = 2		R = 1		R = ½	
	New Infected	Infected Sum	New Infected	Infected Sum	New infected	Infected Sum
0	16	16	16	16	16	16
1						
2						
3						
4						

2c. For each basic reproductive number, graph the development of the total number of infected persons.

NUMBER OF INFECTED

CYCLE

2d. Does the basic reproductive number reveal whether disease spread is decreasing or increasing? Look at the graphs and complete the sentences below.

R = 2 : When the basic reproductive number is 2...

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R = 1 : When the basic reproductive number is 1,...

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R = ½ : When the basic reproductive number is ½,...

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