Final tasks for the exam

Introduction to structural equation modeling and mixed models in 

Day 10: SEM

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Task 1

Invasive fish in ponds

- **`Connect`** – connectedness of pond to other water objects (0-disconnected; 1-connected)
- **`Macr`** – number of species of macrophytes
- **`water_T`** – water temperature
- **`HII`** – human impact intensity index
- **`Tot_fish`** – total number of fish species in pond
- **`Invas_fish`** – number of invasive fish species in pond

```
read.csv("Data/pond.csv")
> str(pond)
'data.frame': 120 obs. of  6 variables:
 $ Connect   : int  0 0 0 0 0 0 0 0 0 0 ...
 $ Macr      : int  20 18 15 14 12 3 21 18 10 18 ...
 $ water_T   : num  14.2 15.6 18.8 17 17.5 ...
 $ HII       : num  2.31 1.83 3.11 2.66 2.63 4.11 2.7 2.56 4.12 2.47
...
 $ Tot_fish  : int  11 15 15 19 17 18 15 18 19 16 ...
 $ Invas_fish: int  1 1 1 4 3 11 1 2 7 2 ...
```

120 ponds

Day 10 Task 2

Invasive fish in ponds

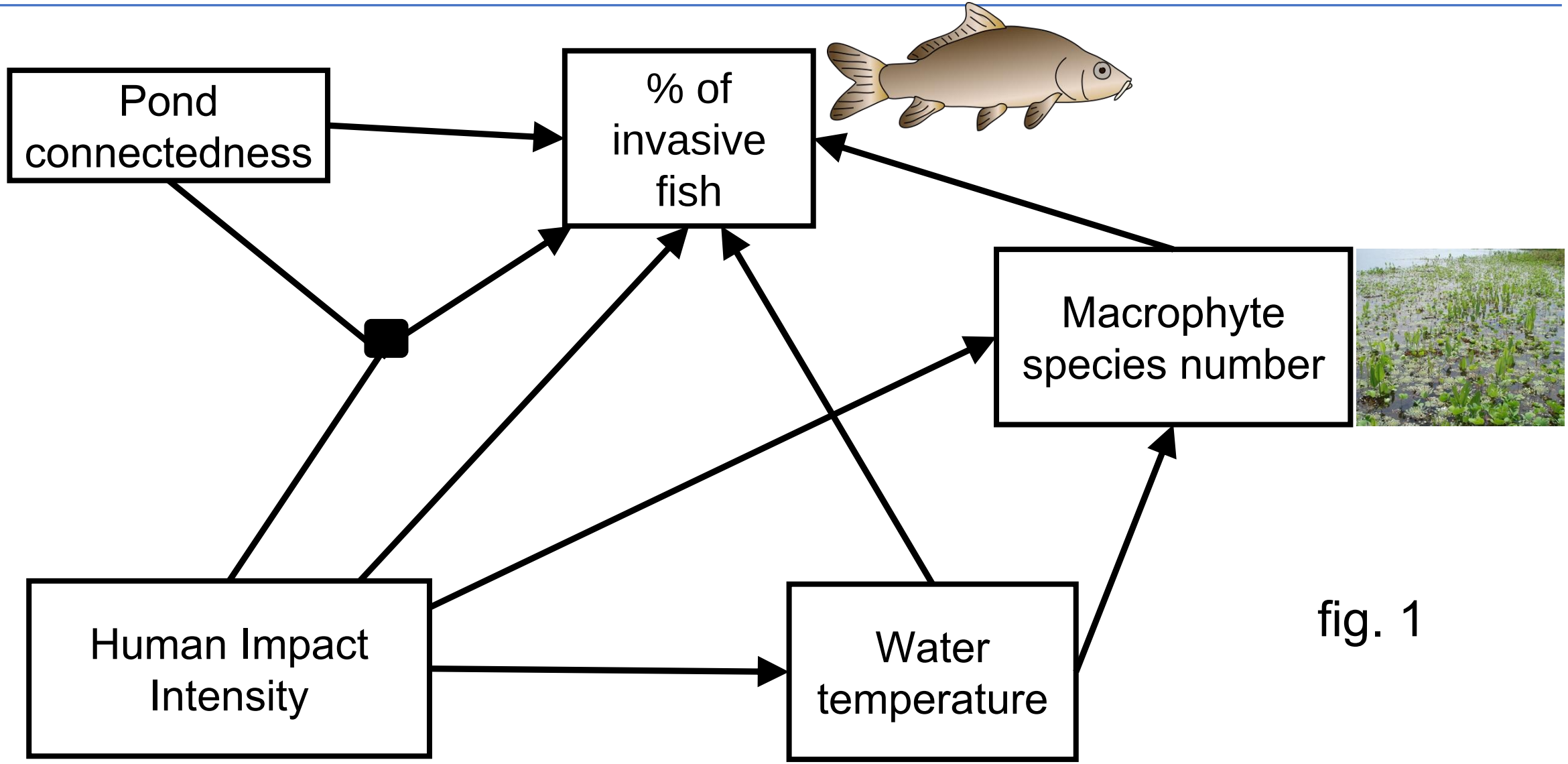
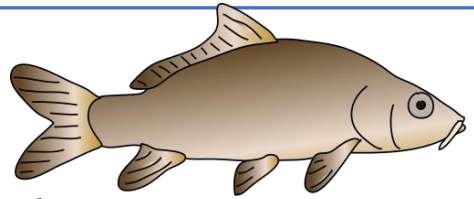


fig. 1

Day 10 Task 2

Invasive fish in ponds



Pond connectedness

% of invasive fish

Macrophyte species number

Human Impact Intensity

Water temperature

fig. 1

Day 10 Task 2

Tasks:

1. Build the SEM model (model 1) as shown on fig. 1, including the interaction among pond connectedness and human Impact Intensity

2. Test the model fit

3. Fill in the standardized coefficients and the explained by model variances.

4. Calculate direct, indirect, and total effects of "Human Impact Intensity" on "% of invasive fish".

5. Build model 2, which excludes the interaction among pond connectedness and human Impact Intensity. Compare model 1 and model 2. Select model which more accurately represents the data.