

# MVLU COLLEGE

## Subject:-Data Analysis with SAS / SPSS /R

### 11. Reshaping data using pivot\_longer() and pivot\_wider() (R).

The screenshot shows two separate RStudio sessions side-by-side, both titled "Untitled 1" and connected to the same project named "Amazon".

**Session 1 (Left):**

```

4 dt <- read.csv("Amazon.csv", na.strings = c("", "NA"))
5 mutate(
6   ProductID = row_number(),
7   Price = UnitPrice
8 ) %>%
9 select(ProductID, Category, Price, Discount)
10 print("--- original data ---")
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```

# MVLU COLLEGE

## Subject:-Data Analysis with SAS / SPSS /R

The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Project Bar:** Untitled1, S098 P11.R, Amazon.
- Code Editor:** An R script titled "Untitled1.R" containing code for data cleaning and pivoting. The code reads a CSV file, removes rows with missing values, adds a row number column, and prints the original data. It then creates a wide format, performs category pivoting, and prints the category pivot.
- Console:** Shows the R session output, including the creation of a tibble, the wide format data, and the category pivot.
- Environment:** Shows various objects in the global environment, such as category\_pivot, clean.omit, clean\_replace, data, data\_feb, data\_jan, data\_new\_hires, df, df\_calc, and df\_clean.
- Files:** A sidebar showing files in the current directory, including .RData, .Rhistory, AI\_Impact\_on\_Jobs\_2030.csv, Amazon.csv, Database1.accdb, desktop.ini, dynamicInitialization.java, GIS DataBase, gl\_gpwv3\_pdens\_00\_ascii\_one, gl\_gpwv3\_pdens\_90\_ascii\_one, global\_ai\_workforce\_automation\_201!, global\_gaming\_esports\_2010\_2025.xls, IISExpress, Mental\_Health\_and\_Social\_Media\_Bali, My Web Sites, and NetBeansProjects.
- System Status:** Shows battery level (SENSEX 0.39%), system icons, and system status (ENG IN, 08-12-2025, 11:19).

```

4 df <- read.csv("Amazon.csv", na.strings = c("", "NA")) %>%
5   mutate(
6     ProductID = row_number(),
7     Price = unite(price,
8       ) %>%
9     select(-ProductID, Category, Price, Discount)
10  print("--- original Data ---")
11
3741 [Top Level] <

```

```

[R] R4.5.2 - ~/d
[1] "## wide Format ##"
> print(head(wide_df))
# A tibble: 6 × 4
  ProductID Category      Price Discount
    <dbl> <chr>      <dbl>   <dbl>
1       1 Books        107.     0
2       2 Home & Kitchen 251.    0.05
3       3 Clothing     35.0    0.1
4       4 Home & Kitchen 33.6    0.15
5       5 Clothing     516.    0.25
6       6 Books        450.     0
> df_clean <- df %>%
+   mutate(Category = ifelse(is.na(Category), "Unknown", Category))
> categories <- df_clean %>%
+   select(-ProductID, -Category, -Price) %>%
+   pivot_wider(
+     names_from = Category,
+     values_from = Price
+   )
> print("## Category Pivot ##")
[1] "## Category Pivot ##"
> print(head(category_pivot))
# A tibble: 6 × 6
  ProductID `Books` `Home & Kitchen` `Clothing` `Toys & Games` `Sports & Outdoors` `Electronics`
    <dbl>    <dbl>          <dbl>    <dbl>          <dbl>          <dbl>          <dbl>
1       1     107.         NA           NA           NA           NA           NA
2       2     NA           251.         NA           NA           NA           NA
3       3     NA           NA           35.0         NA           NA           NA
4       4     NA           NA           33.6         NA           NA           NA
5       5     NA           NA           516.         NA           NA           NA
6       6     450.          NA           NA           NA           NA           NA
> |

```

# MVLU COLLEGE

## Subject:-Data Analysis with SAS / SPSS /R

12 Combining datasets vertically (concatenation) using rbind() (R).

Write code toCombining datasets vertically (concatenation) using rbind() in R studio.

```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Console Terminal Background Jobs
R - 4.5.2 ~/ ...
> mental_df <- read.csv("Mental_Health_and_Social_Media_Balance_Dataset.csv")
> student_df <- read.csv("Student_Mental_health.csv")
> print("--- Data Structure Before Transformation ---")
[1] "---- Data Structure Before Transformation ----"
> print(names(mental_df))
[1] "User_ID"           "Age"                  "Gender"              "Daily_Screen_Time.hrs."
[5] "Sleep_Quality.1.10." "Stress_Level.1.10." "Days_without_Social_Media" "Exercise_Frequency.week."
[9] "Social_Media_Platform" "Happiness_Index.1.10."
> print(names(student_df))
[1] "Timestamp"          "Choose.your.gender"
[3] "Age"                 "what.is.your.course."
[5] "Your.current.year.of.study" "what.is.your.GPA."
[7] "Marital.status"      "Do.you.have.depression."
[9] "Do.you.have.Anxiety." "Do.you.have.Panic.attack."
[11] "Did.you.seek.any.specialist.for.a.treatment."
> mental_clean <- mental_df %>% select(Age)
> student_clean <- student_df %>% select(Age)
> combined_data <- rbind(mental_clean, student_clean)
> print("--- Combined Data Summary ---")
[1] "---- Combined Data Summary ----"
> print(paste("Mental dataset rows:", nrow(mental_clean)))
[1] "Mental dataset rows: 500"
> print(paste("Student dataset rows:", nrow(student_clean)))
[1] "Student dataset rows: 101"
> print(paste("Total rows (Expected):", nrow(mental_clean) + nrow(student_clean)))
[1] "Total rows (Expected): 601"
> print(paste("Total rows (Actual):", nrow(combined_data)))
[1] "Total rows (Actual): 601"
> print("---- Preview of combined data (Top and Bottom) ----")
[1] "---- Preview of combined data (Top and Bottom) ----"
> print(head(combined_data))
#> #> #> #> #>
Age
1 44
2 30
3 23
4 36
5 34
6 38
> print(tail(combined_data))
#> #> #> #> #>
Age
596 18
597 21
598 18
599 19
600 23
601 20
  
```

The screenshot shows the RStudio interface with the code for concatenating datasets vertically using rbind(). The code reads two CSV files, 'Mental\_Health\_and\_Social\_Media\_Balance\_Dataset.csv' and 'Student\_Mental\_health.csv', and prints their structures before transformation. It then creates two clean data frames by selecting the 'Age' column from each and concatenates them using rbind(). Finally, it prints the total number of rows and a preview of the combined data.

```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Console Terminal Background Jobs
R - 4.5.2 ~/ ...
> mental_df <- read.csv("Mental_Health_and_Social_Media_Balance_Dataset.csv")
> student_df <- read.csv("Student_Mental_health.csv")
> print("--- Data Structure Before Transformation ---")
[1] "---- Data Structure Before Transformation ----"
> print(names(mental_df))
[1] "User_ID"           "Age"                  "Gender"              "Daily_Screen_Time.hrs."
[5] "Sleep_Quality.1.10." "Stress_Level.1.10." "Days_without_Social_Media" "Exercise_Frequency.week."
[9] "Social_Media_Platform" "Happiness_Index.1.10."
> print(names(student_df))
[1] "Timestamp"          "Choose.your.gender"
[3] "Age"                 "what.is.your.course."
[5] "Your.current.year.of.study" "what.is.your.GPA."
[7] "Marital.status"      "Do.you.have.depression."
[9] "Do.you.have.Anxiety." "Do.you.have.Panic.attack."
[11] "Did.you.seek.any.specialist.for.a.treatment."
> mental_clean <- mental_df %>% select(Age)
> student_clean <- student_df %>% select(Age)
> combined_data <- rbind(mental_clean, student_clean)
> print("---- combined data summary ---")
[1] "---- Combined data summary ---"
> print(paste("Mental dataset rows:", nrow(mental_clean)))
[1] "Mental dataset rows: 500"
> print(paste("Student dataset rows:", nrow(student_clean)))
[1] "Student dataset rows: 101"
> print(paste("Total rows (Expected):", nrow(mental_clean) + nrow(student_clean)))
[1] "Total rows (Expected): 601"
> print(paste("Total rows (Actual):", nrow(combined_data)))
[1] "Total rows (Actual): 601"
> print("---- Preview of combined data (Top and Bottom) ----")
[1] "---- Preview of combined data (Top and Bottom) ----"
> print(head(combined_data))
#> #> #> #> #>
Age
1 44
2 30
3 23
4 36
5 34
6 38
> print(tail(combined_data))
#> #> #> #> #>
Age
596 18
597 21
598 18
599 19
600 23
601 20
  
```

This screenshot is identical to the one above, showing the RStudio interface with the same code for concatenating datasets vertically using rbind(). The code and output are identical to the first screenshot.

# MVLU COLLEGE

## Subject:-Data Analysis with SAS / SPSS /R

### 13. Identifying and handling duplicates using distinct() (R studio ).

The screenshot shows the RStudio interface with the following details:

- Console:** Displays R code and its output. The code uses the dplyr package to manipulate a dataset named 'orders\_df'. It prints the original dataset, identifies rows that are identical, removes exact duplicates, and prints the unique customers.
- Environment:** Shows the global environment with various objects like 'choose\_your.gender', 'what\_is\_your.course.', 'Age', 'split\_matrix', etc.
- File Explorer:** Shows files in the current directory, including CSV files like 'global\_ai\_workforce\_automation\_2011.csv' and 'global\_gaming\_esports\_2010\_2025.csv'.
- Task View:** Shows recent files and projects.
- System Tray:** Shows weather (30°C, Sunny), battery level (12:29), and system status (ENG IN).

```

library(dplyr)
orders_df <- data.frame(
  OrderID = c(201, 202, 202, 203, 204, 201, 204),
  Customer = c("Amit", "Neha", "Neha", "Rohan", "Sneha", "Amit", "Sneha"),
  Product = c("Keyboard", "Mouse", "Mouse", "Camera", "Speaker", "Keyboard", "Headset")
)
print("--- 1. Original Dataset (Note 7 rows) ---")
[1] "--- 1. original dataset (Note 7 rows) ---"
print(orders_df)
#> # A tibble: 2 x 4
#> Groups: OrderID, Customer, Product [2]
#>   OrderID Customer Product
#>       n
#>   <dbl> <chr>   <chr> <chr>
#> 1     201 Amit     Keyboard
#> 2     202 Neha    Mouse
#> 3     202 Neha    Mouse
#> 4     203 Rohan   Camera
#> 5     204 Sneha   Speaker
#> 6     201 Amit     Keyboard
#> 7     204 Sneha   Headset
#> 
duplicates_report <- orders_df %>%
  group_by(OrderID, Customer, Product) %>%
  count() %>%
  filter(n == 1)
print("--- 2. Identification Report (Rows that are duplicated) ---")
[1] "--- 2. Identification Report (Rows that are duplicated) ---"
print(duplicates_report)
#> # A tibble: 2 x 4
#> Groups: OrderID, Customer, Product [2]
#>   OrderID Customer Product
#>       n
#>   <dbl> <chr>   <chr> <chr>
#> 1     201 Amit     Keyboard
#> 2     202 Neha    Mouse
#> 
clean_exact <- orders_df %>%
  distinct()
print("--- 3. Removed Exact Duplicates (distinct) ---")
[1] "--- 3. Removed Exact Duplicates (distinct) ---"
print(clean_exact)
#> #> # A tibble: 2 x 4
#> #> Groups: OrderID, Customer, Product [2]
#> #>   OrderID Customer Product
#> #>       n
#> #>   <dbl> <chr>   <chr> <chr>
#> #> 1     201 Amit     Keyboard
#> #> 2     202 Neha    Mouse
#> #> 3     203 Rohan   Camera
#> #> 4     204 Sneha   Speaker
#> #> 5     204 Sneha   Headset
#> 
unique_customers <- orders_df %>%
  distinct(Customer, .keep_all = TRUE)

```

This screenshot is nearly identical to the first one, showing the same RStudio interface and code execution. The only difference is the timestamp in the system tray, which has changed from 12:29 to 12:29.

# **MVLU COLLEGE**

## **Subject:-Data Analysis with SAS / SPSS /R**

#### 14. Extracting date components using lubridate:: functions (R).

The screenshot shows the RStudio interface with the following components:

- Top Bar:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Source Editor:** Displays R code for extracting date components from a string and printing them. It also prints current time extraction results.
- Environment Browser:** Shows the global environment with objects like student\_df, Student\_Menta, ua\_passengers, unique\_custom, unique\_patient, wide\_df, avg\_cgpa, common\_cols, and current\_time.
- File Browser:** Shows a list of files in the current directory, including gpwv3\_pdens\_00\_ascii\_one, gpwv3\_pdens\_90\_ascii\_one, global\_forces\_automation\_201!, global\_gaming\_exports\_2010\_2025.csv, IISExpress, Mental\_Health\_and\_Social\_Media\_Bali, My Web Site, NetBeansProjects, patient\_data.csv, Power BI Desktop, practical, Presentation3.pptx, PrintGreatest.java, R, random\_dataset.csv, S098\_P6.R, S098\_P7.R, and S098\_P8.R.

# MVLU COLLEGE

## Subject:-Data Analysis with SAS / SPSS /R

### 15. Generating basic summaries using str() or summary() (R).

The screenshot shows the RStudio interface with the following R code in the console:

```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Console Terminal Background Jobs
(R - R 4.5.2 - ~)
> retail_df <- data.frame(
+   ID = 1:6,
+   Category = c("Grocery", "Electronics", "Clothing", "Grocery", "Sports", "Electronics"),
+   Price = c(120.00, 999.00, 450.75, NA, 800.00, 1500.00),
+   In_Stock = c(TRUE, FALSE, TRUE, FALSE, TRUE, TRUE),
+   Rating = c(4.0, 4.8, 3.9, 4.3, 4.6, 4.9)
+ )
> print("--- Data Loaded ---")
[1] "--- Data Loaded ---"
> print("--- OUTPUT OF str() ---")
[1] " --- OUTPUT OF str() ---"
> str(retail_df)
'data.frame': 6 obs. of 5 variables:
 $ ID : int 1 2 3 4 5 6
 $ Category: chr "Grocery" "Electronics" "Clothing" "Grocery" ...
 $ Price : num 120 999 451 NA 800 ...
 $ In_Stock: logi TRUE FALSE TRUE FALSE TRUE
 $ Rating : num 4.0 4.8 3.9 4.3 4.6 4.9
> print("--- OUTPUT OF summary() [Before Factor Conversion] ---")
[1] " --- OUTPUT OF summary() [Before Factor Conversion] ---"
> summary(retail_df)
   ID   Category   Price   In_Stock   Rating
Min. :1.00   Clothing :1   Min. :120.0   Mode :logical   Min. :3.900
1st Qu.:2.25 Electronics:2   1st Qu.:450.8   FALSE:2    1st Qu.:4.075
Median :3.50 Mode :character Median :800.0   TRUE :4     Median :4.450
Mean   :3.50 Mean   :774.0   NA's       :1       Mean   :4.417
3rd Qu.:4.75 3rd Qu.:999.0  Max.       :1500.0  NA's       :1       3rd Qu.:4.750
Max.   :6.00  Max.   :1500.0  NA's       :1       Max.   :4.900
NA's   :1
> retail_df$category <- as.factor(retail_df$category)
> print("--- OUTPUT of summary() [After Factor Conversion] ---")
[1] " --- OUTPUT of summary() [After Factor Conversion] ---"
> summary(retail_df)
   ID   Category   Price   In_Stock   Rating
Min. :1.00   Clothing :1   Min. :120.0   Mode :logical   Min. :3.900
1st Qu.:2.25 Electronics:2   1st Qu.:450.8   FALSE:2    1st Qu.:4.075
Median :3.50 Grocer...:2   Median :800.0   TRUE :4     Median :4.450
Mean   :3.50 Sports   :1   Mean   :774.0   NA's       :1       Mean   :4.417
3rd Qu.:4.75 3rd Qu.:999.0  3rd Qu.:1500.0  NA's       :1       3rd Qu.:4.750
Max.   :6.00  Max.   :1500.0  Max.   :4.900
NA's   :1
> avg_rating <- mean(retail_df$Rating)
> max_price <- max(retail_df$Price, na.rm = TRUE)
> print(paste("Average Rating:", avg_rating))
[1] "Average Rating: 4.41666666666667"
> print(paste("Highest Price:", max_price))
[1] "Highest Price: 1500"
>

```

The RStudio environment pane shows objects like ua\_passengers, unique\_customers, unique\_patient, wide\_df, avg\_cpgp, avg\_rating, common\_cols, current\_time, and max\_price.

This screenshot shows the RStudio interface with the same R code as the previous one, demonstrating consistency in the results.