

Homework 4: Writing Functions, Querying an API, and Tidy-Style Functions

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```
#|message=FALSE
#|warning=FALSE

# Load in necessary packages
suppressPackageStartupMessages(library(tidyverse))
suppressPackageStartupMessages(library(httr))
suppressPackageStartupMessages(library(jsonlite))
```

Task 1: Conceptual Questions

1. What is the purpose of the `lapply()` function? What is the equivalent `purrr` function?

```
t1_q1 <- "The `lapply()` function is used to apply functions to lists. For example, if we used the function `mean()` within the `lapply()`, we could apply that function to each list element. The equivalent function in the `purrr` package is `map()`, which can be applied to 1 list. There is also `map2()` which can apply functions to 2 lists and then `pmap()` can apply the function to any number of lists"
```

2. Suppose we have a list called `my_list`. Each element of the list is a numeric data frame (all columns are numeric). We want to use `lapply()` to run the code `cor(numeric_matrix, method = "kendall")` on each element of the list. Write code to do this below!

```
#make a numeric list

df_1 <- data.frame(a = 1:5, b = 11:15)
df_2 <- data.frame(c = rnorm(5), d = rnorm(5))
df_3 <- data.frame(e = rnorm(4), f = c(2, 5, 22, 23))

my_list <- list(df_1, df_2, df_3)

t1_q2 <- lapply(my_list, FUN = cor, method = "kendall")
```

3. What are two advantages of using purrr functions instead of the BaseR apply family?

```
t1_q3 <- "One advantage of `purrr` over the apply family is that it provides a
`tidyverse` alternative to the `apply()` family, allowing for consistent syntax
and the output is more predictable. Another advantage is that `purrr` allows you
shorthand to make anonymous functions."
```

4. What is a side-effect function?

```
t1_q4 <- "Side-effect functions are functions that produce something but do not
change the data. Some examples of side-effect functions include `print()`,
`write_csv()`, or `plot()`"
```

5. Why can you name a variable sd in a function and not cause any issues with the sd function?

```
t1_q5 <- "You can name a variable `sd` within a function and not cause any issues
with the `sd` function due to Lexical Scoping. When a function is called, the
environment that the function is performed in is temporary. Once the function is
complete, that variable created within the function is not saved. It only works
within the local function and not the `globalenv()`."
```

Creating a list with the above question answers

```
task1_answer_list <- list(t1_q1, t1_q2, t1_q3, t1_q4, t1_q5)
```

Task 2: Writing R Functions

Question 1: Create a function to calculate root mean square error

```
#function to getRMSE - first input will be response, 2nd will be predictions, and add
#elipses
getRMSE <- function(resp, pred, ...) {
  #start by getting the squared error
  sq_error <- (resp - pred)^2
  #take mean of squared error, then the square root
  #add ... to allow for additional arguments
  rmse <- sqrt(mean(sq_error, ...))
  #return the root mean square error
  return(rmse)
}
```

Question 2: Testing our function to get the Root Mean Square Error

Let's create some response and predicted values

```
set.seed(10)
n <- 100
x <- runif(n)
resp <- 3 + 10*x + rnorm(n)
pred <- predict(lm(resp ~ x), data.frame(x))

getRMSE(resp, pred)
```

```
[1] 0.9581677
```

Now will replace 2 response values with missing

```
resp[c(5, 9)] <- NA_real_
```

Let's use my function without specifying how to handle missing values

```
getRMSE(resp, pred)
```

```
[1] NA
```

Let's retest the function specifying how to handle missing values

```
getRMSE(resp, pred, na.rm=T)
```

```
[1] 0.9627749
```

Question 3: Now let's create a function to calculate the mean absolute deviation.

```
#function to get the Mean absolute deviation - first input will be response,
#2nd will be predictions, and add ellipses
getMAE <- function(resp, pred, ...) {
  #take the mean of the absolute value of response minus predicted
  mean_abs_dev <- mean(abs((resp - pred)),...)

  #return the mean absolute deviation
  return(mean_abs_dev)
}
```

Question 4: Testing our function to get the Mean Absolute Deviation

Let's create some response and predicted values

```
set.seed(10)
n <- 100
x <- runif(n)
resp <- 3 + 10*x + rnorm(n)
pred <- predict(lm(resp ~ x), data.frame(x))

getMAE(resp, pred)
```

```
[1] 0.8155776
```

Now will replace 2 response values with missing

```
resp[c(12, 33)] <- NA_real_
```

Let's use my function without specifying how to handle missing values

```
getMAE(resp, pred)
```

```
[1] NA
```

Let's retest the function specifying how to handle missing values

```
getMAE(resp, pred, na.rm=T)
```

```
[1] 0.8185156
```

Question 5: Create a wrapper function to return both the Root Mean Square Error and Mean Absolute Deviation with a single call

```
pred_wrapper <- function(resp, pred, metrics = c("rmse", "mae"), ...) {  
  #first, need to check if input is a vector, atomic, and numeric  
  #will do first for resp input, then for pred input  
  
  if (!(is.vector(resp) && is.atomic(resp) && is.numeric(resp))) {  
    message("Error: 'resp' input must be a numeric atomic vector")  
    return(NULL)  
  }  
  
  if (!(is.vector(pred) && is.atomic(pred) && is.numeric(pred))) {  
    message("Error: 'pred' input must be a numeric atomic vector")  
    return(NULL)  
  }  
  #create a list to store the results  
  
  results <- list()  
  
  #Use root mean square function  
  if ("rmse" %in% metrics) {  
    results[["Root Mean Square Error"]] <- getRMSE(resp, pred, ...)  
  }  
}
```

```

}

#use mean absolute deviation function
if ("mae" %in% metrics){
  results[["Mean Absolute Deviation"]] <- getMAE(resp, pred, ...)
}

#return the list of results
return(results)
}

```

Question 6: Testing the Wrapper Function

Let's create some response and predicted values

```

set.seed(10)
n <- 100
x <- runif(n)
resp <- 3 + 10*x + rnorm(n)
pred <- predict(lm(resp ~ x), data.frame(x))

```

Let's test the wrapper function first by calling each metric by themselves

First will be for Root Mean Square Error

```

pred_wrapper(resp,pred, metrics = "rmse")

```

```

$`Root Mean Square Error`
[1] 0.9581677

```

Next we will call for Mean Absolute Deviation

```

pred_wrapper(resp,pred, metrics = "mae")

```

```

$`Mean Absolute Deviation`
[1] 0.8155776

```

Now let's call both metrics

```
pred_wrapper(resp,pred, metrics = c("rmse", "mae"))
```

```
$`Root Mean Square Error`  
[1] 0.9581677
```

```
$`Mean Absolute Deviation`  
[1] 0.8155776
```

Now we are going to change 2 response values to missing

```
resp[c(1, 82)] <- NA_real_
```

We will test using the original function, followed by testing indicating to remove missing values

```
pred_wrapper(resp,pred, metrics = c("rmse", "mae"))
```

```
$`Root Mean Square Error`  
[1] NA
```

```
$`Mean Absolute Deviation`  
[1] NA
```

```
pred_wrapper(resp,pred, metrics = c("rmse", "mae"), na.rm=TRUE)
```

```
$`Root Mean Square Error`  
[1] 0.9649399
```

```
$`Mean Absolute Deviation`  
[1] 0.8214778
```

Now, let's create a data frame. We will then test what happens when that is input into the function

```
test_df <- data.frame(  
  letters = 1:6,  
  age = sample(18:45, 6)  
)
```

```
pred_wrapper(test_df, pred, metrics = c("rmse", "mae"))
```

Error: 'resp' input must be a numeric atomic vector

NULL

Task 3: Querying an API and a Tidy-Style Function

For this task we will connect to an API from [News API](#).

Question 1: Use the GET() function from the httr package to return an interesting topic. Let's get top headlines for recent sports events

```
URL_sports_headlines <- "https://newsapi.org/v2/everything?q=Yankees&source=us&apiKey=e09f041046"
id_sports_headlines <- httr::GET(URL_sports_headlines)
```

Question 2: Now let's parse what was returned and find the data frame with article information

```
#Look at structure of data
str(id_sports_headlines, max.level = 1)
```

List of 10

```
$ url      : chr "https://newsapi.org/v2/everything?q=Yankees&source=us&apiKey=e09f041046"
$ status_code: int 200
$ headers   :List of 13
  ..- attr(*, "class")= chr [1:2] "insensitive" "list"
$ all_headers:List of 1
$ cookies    : 'data.frame':  0 obs. of  7 variables:
$ content    : raw [1:78897] 7b 22 73 74 ...
$ date       : POSIXct[1:1], format: "2025-06-21 19:50:31"
$ times      : Named num [1:6] 0 0.856 0.88 0.918 1.093 ...
  ..- attr(*, "names")= chr [1:6] "redirect" "namelookup" "connect" "pretransfer" ...
$ request    :List of 7
  ..- attr(*, "class")= chr "request"
$ handle     :Class 'curl_handle' <externalptr>
- attr(*, "class")= chr "response"
```


Next, parse the data using jsonlite package

```
parsed_sports_headlines <- fromJSON(rawToChar(id_sports_headlines$content))
sports_headlines <- as_tibble(parsed_sports_headlines)
sports_headlines$articles
```

	source.id	source.name
1	espn	ESPN
2	espn	ESPN
3	espn	ESPN
4	espn	ESPN
5	<NA>	HYPEBEAST
6	espn	ESPN
7	<NA>	MacRumors
8	espn	ESPN
9	<NA>	Rolling Stone
10	<NA>	HYPEBEAST
11	<NA>	TMZ
12	<NA>	/FILM
13	lenta	Lenta
14	espn	ESPN
15	espn	ESPN
16	<NA>	The New Yorker
17	<NA>	Search Engine Journal
18	espn	ESPN
19	<NA>	Forbes
20	<NA>	HYPEBEAST
21	<NA>	Forbes
22	<NA>	Forbes
23	<NA>	Forbes
24	time	Time
25	<NA>	Forbes
26	<NA>	MLB Trade Rumors
27	espn	ESPN
28	espn	ESPN
29	<NA>	Forbes
30	<NA>	Forbes
31	<NA>	Forbes
32	<NA>	Forbes
33	<NA>	Biztoc.com
34	espn	ESPN
35	<NA>	MLB Trade Rumors

36	<NA>	Forbes
37	fox-sports	Fox Sports
38	espn	ESPN
39	espn	ESPN
40	espn	ESPN
41	<NA>	MLB Trade Rumors
42	<NA>	MLB Trade Rumors
43	<NA>	Forbes
44	<NA>	MLB Trade Rumors
45	espn	ESPN
46	<NA>	MLB Trade Rumors
47	fox-sports	Fox Sports
48	fox-sports	Fox Sports
49	<NA>	MLB Trade Rumors
50	fox-sports	Fox Sports
51	<NA>	TMZ
52	fox-sports	Fox Sports
53	espn	ESPN
54	fox-sports	Fox Sports
55	espn	ESPN
56	fox-sports	Fox Sports
57	fox-sports	Fox Sports
58	espn	ESPN
59	espn	ESPN
60	espn	ESPN
61	fox-sports	Fox Sports
62	fox-sports	Fox Sports
63	fox-sports	Fox Sports
64	<NA>	Deadline
65	espn	ESPN
66	espn	ESPN
67	fox-sports	Fox Sports
68	fox-sports	Fox Sports
69	espn	ESPN
70	espn	ESPN
71	espn	ESPN
72	espn	ESPN
73	espn	ESPN
74	espn	ESPN
75	espn	ESPN
76	<NA>	MLB Trade Rumors
77	espn	ESPN
78	fox-sports	Fox Sports

79	fox-sports	Fox Sports
80	espn	ESPN
81	<NA>	MLB Trade Rumors
82	<NA>	MLB Trade Rumors
83	<NA>	Cracked.com
84	<NA>	MLB Trade Rumors
85	<NA>	MLB Trade Rumors
86	<NA>	Highsnobiety
87	<NA>	Highsnobiety
88	fox-sports	Fox Sports
89	fox-sports	Fox Sports
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91	espn	ESPN
92	espn	ESPN
93	espn	ESPN
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95	espn	ESPN

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Dobbins defends claim father played for Yanl
Sources: Yankees closer Weaver out 4-6 w
Aaron Judge and Shohei Ohtani both blast home runs in first inning of Yankees-Dodg
Judge, 18 HRs, insists he's still 'work in progr
This Nike Dunk Low Roots for the "New York Yank
Jac jack: Royals' Caglianone belts first ML
Apple TV+ Announces MLB Friday Night Baseball Schedule for J
MLB reveals uniforms for 2025 All-Star Game, Home Run De
Yankees vs. Dodgers: How to Watch the World Series Rema
Feid Surprises His Fans With 'FERXXO VOL X: Sagra
Cody Bellinger's Dad Says Yankees' Offseason Haul Better Than Keeping Juan S
Gary Cooper's Genre-Defining Sports Movie With Babe Ruth Is Streaming For M
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Rockies' lows: 10th sweep; 3rd-fastest to 50
Judge, Ohtani lapping field in All-Star vot

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 17 Google I/O 2025: The Background Google Didn't Tell You via @sejournal, @MordyObers
 18 The 7 MLB execs under the most pressure at the trade dead
 19 New York Yankees, Boston Red Sox Renew Rivalry In Differing Spots In The AL
 20 Madhappy Opens First New York City Flag
 21 As New York Yankees Roll Into Dodger Stadium, They Are Getting Positive Injury
 22 Yankees Experience Lost Weekend In Boston And Then See Rafael Devers Moved Out Of The AL
 23 The Yankees Offense Has Completely Stopped Producing
 24 Kim Ng Made Baseball History. Now She's Taking On Soft
 25 Pitching Helps New York Yankees Complete One-Third Of Season In Good S
 26 Yankees Select Jayvien Sandr
 27 MLB Power Rankings: A brand-new team debuts at N
 28 What all 30 MLB teams must do before the trade dead
 29 Hunter Dobbins Enters Red Sox-Yankee Rivalry With Unique Pitching
 30 Versatile Offense And Stingy Pitching Fuel Tampa Bay Rays' S
 31 Jazz Chisholm Jr. Smiles His Way Through A Smooth Return For The New York Yan
 32 Aaron Judge Living Up To Preferred 'Hitter' Label With .396 Avera
 33 Carlos Carrasco rejoins the Yankees to bolster depleted bull
 34 The gauntlet of the SEC baseball tournament and what to know going
 35 The Opener: Burnes, Yankees, Black
 36 The Red Sox Swindled The Yankees Out Of A Potential All-Star Cat
 37 Yankees vs. Red Sox: Historic MLB rivalry by the num
 38 Pride of the Yankees: Three days with Aaron Judge on the road to immorta
 39 Yankees' Stanton to begin rehab assign
 40 Stanton continues to progress as Yanks optimis
 41 The Opener: Yankees, Nationals, Verlander, Shee
 42 Yankees Notes: Weaver, Stanton, Rice, Stroman, V
 43 Former Yankees Pitcher Sam Militello Has Had A 'Rewarding' 25 Years With The Tampa Spar
 44 Yankees Place Carlos Carrasco On Outright Wai
 45 Yankees place RHP de los Santos (elbow) on
 46 Yankees To Select Carlos Carrasco; Jake Woodford Triggers Opt
 47 Yankees' struggles, Dodgers' depth, and big homers: The World Series reunion had it
 48 Who are the top 10 New York Yankees of all t
 49 Yankees Reportedly Interested In Right-Handed Bat, Rotation
 50 Yankees call players only meeting to address 3 straight scoreless lo
 51 Diddy Trial Juror Dismissed by Judge Over Residency I
 52 Yankees vs. Dodgers top questions: What's at stake in this star-studded ser
 53 Passan's early MLB trade deadline preview: Latest intel on all 30 t
 54 Dodgers' Mookie Betts is day-to-day after injuring his left toe in mi
 55 Preview: Top storylines, prospects and major leaguers for all t
 56 2025 MLB odds: Back Yankees to win American Lea
 57 Last Night in Baseball: Yankees give New York fans something to cheer ab
 58 Judge 1-for-12 as NY swept: Got to swing at str

59 June MLB games on ESPN: Yankees-Red Sox, Mets-Phillies, r
 60 L.A.'s Betts day-to-day after stubbing toe in mi
 61 Yankees having Billy Joel bobblehead giveaway on July 11 vs. C
 62 Last Night in Baseball: Giancarlo Stanton is (Also) I
 63 Last Night in Baseball: The Yankees Have Lost 6 in a Row (But Weren't Shut Ou
 64 UTA Signs Director D.J. Ca
 65 Rangers catcher Heim exits early with hand in
 66 Torre to be honorary AL coach for All-Star C
 67 Dodgers, Yankees haven't 'skipped a beat' despite inju
 68 2025 MLB power rankings: Tigers jump, Dodgers best Yankees ag
 69 Yanks finally score, otherwise sputter in latest I
 70 Yanks' bats 'in a little rut,' blanked in 3rd stra
 71 Guardians put Hedges on IL after 5th concuss
 72 In need of depth, Yanks call up vet RHP Carr
 73 Yanks' Cabrera cites 'small possibility' he'll re
 74 Aaron, Bret renew Boone Bowl in Yanks-Rang
 75 Angels catcher O'Hoppe hit in head by backsv
 76 Dominic Smith Opts Out Of Minor League Deal With Yanl
 77 NYC native Moore posts 1st MLB hit vs. Yanl
 78 Dodgers rout: LA scores most runs ever in a game against New Y
 79 Yankees avoid getting swept by Dodgers despite hitless night from Aaron Ju
 80 Yankees place reliever Cruz on IL due to shoul
 81 Yankees Planning To Place Luke Weaver On Injured L
 82 Cooper Hummel Triggers Release Clause In Deal With Yanl
 83 20 Times 'SNL' Was Hosted by Two or More Peo
 84 Yankees Considering Starts For Ben Rice At Cat
 85 Yankees' Jake Cousins Dealing With Potential UCL Inj
 86 Madhappy In the City (EXCLUS
 87 It's a Polo Shirt Kind of Sur
 88 Dodgers vs. Yankees: Which team has the edge at each position? Here's our pi
 89 Jazz is back! Chisholm Jr. hits a solo shot in injury return to help Yankees
 90 Judge homers off Red Sox rookie after jab at Y
 91 Yanks' Weaver gets PRP injection in hamstr
 92 Death of Gardner's son still under investigat
 93 Dodgers' Betts (toe) progressing, eyes quick re
 94 Yanks' Chisholm likely to play 3B as return ne
 95 Hard tag reignites Chisholm's feud with Gar

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Apple and Major League Baseball this week announced the July schedule for Friday Night Baseball.

SummaryThe Colombian star revealed several tracks on Twitch last week. The album features a collaboration with J Balvin. Any Yankees fans still shedding tears over Juan Soto's Pinstripes?

Aaron Judge, the slugger who leads the majors in batting average, and Shohei Ohtani. As the marlins look to make a move, Baseball meets AI in Google I/O.

SummaryMadhappy has opened its doors to the brand's first-ever New York City flagship store.

The Yankees announced today that they have selected the contract of left-hander Jacob deGrom. Hunter Dobbin.

On the heels of an early morning trade, here are three things we'll be keeping an eye on.

Here are four things we'll be keeping an eye on around the baseball world throughout the season. Yankees manager Aaron Boone provided the media (including the New York Post's Greg J.

The Yankees have placed right-hander Carlos Carrasco on outright waivers, reports J.

Right-hander Jake Woodford has opted out of his minor league deal with the Yankees.

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The Yankees are "aggressively" searching for a right-handed bat to add to their line

Diddy's federal jury in NYC is bringing in an alternate ... beca

EXCLUSIVE: UTA has signed filmmaker D.J. Caruso for representation in all areas. Car

Dominic Smith has become a free agent after triggering the opt-out clause in his mi
Los Angeles Angels second baseman Christian Moore, 22, a New York Ci

Ryan Yarbrough 1.

New York Yankees reliever M

The Yankees expect to place closer Luke Weaver on the 15-day injured list, reports .
Utility player Cooper Hummel has triggered a release clause in his minor league dea

The Yankees are set to welcome Giancarlo Stanton back from the injured list in the m
Yankees reliever Jake Cousins has yet to pitch in the majors this season due to a f

Aaron Judge hit one of his two home runs Sunday night off Red Sox rookie
Yankees closer Luke Weaver, who is out four to six w

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More than 1
Dodgers shortstop

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https://www.espn.com/mlb/story/_/id/4543957/aaron-judge-slams-dodgers-shortstop
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https://www.espn.com/mlb/story/_/id/45399577/aaron-judge-slams-dodgers-shortstop
https://www.espn.com/mlb/story/_/id/45399577/aaron-judge-slams-dodgers-shortstop
<https://hypebeast.com/mlb/aaron-judge-slams-dodgers-shortstop>
https://www.espn.com/mlb/story/_/id/45545360/aaron-judge-slams-dodgers-shortstop
<https://www.macrumors.com/news/aaron-judge-slams-dodgers-shortstop/>
https://www.espn.com/mlb/story/_/id/45525302/major-league-baseball-aaron-judge-slams-dodgers-shortstop
<http://www.rollingstone.com/product-recommendations/mlb/aaron-judge-slams-dodgers-shortstop>
<https://hypebeast.com/mlb/aaron-judge-slams-dodgers-shortstop>
<https://www.t TMZ.com/2025/06/15/aaron-judge-slams-dodgers-shortstop>
<https://www.slashfilm.com/1861749/gary-cooper-slams-dodgers-shortstop/>
<https://lenta.ru/news/2025/06/16/v-seti-voshitii-aaron-judge-slams-dodgers-shortstop/>
https://www.espn.com/mlb/story/_/id/4543957/aaron-judge-slams-dodgers-shortstop
https://www.espn.com/mlb/story/_/id/45526302/aaron-judge-slams-dodgers-shortstop
<https://www.newyorker.com/sports/mlb/aaron-judge-slams-dodgers-shortstop>
<https://www.searchenginejournal.com/gary-cooper-slams-dodgers-shortstop/>
https://www.espn.com/mlb/story/_/id/45517924/mlb-2025-aaron-judge-slams-dodgers-shortstop
<https://www.forbes.com/sites/larryfleisher/2025/06/06/new-york-yankees-boston-red-sox-trade-deadline>
<https://hypebeast.com/mlb/aaron-judge-slams-dodgers-shortstop>
<https://www.forbes.com/sites/larryfleisher/2025/05/30/as-new-york-yankees-roll-into-the-trade-deadline>
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1 Jun 11, 2025, 07:48 PM ET\r\nBOSTON -- Red Sox rookie Hunter Dobbins made some headlines
2 In a significant blow to the first-place New York Yankees, closer Luke Weaver is expected
3 Baseball fans were treated to a major showdown Friday night, as the Los Angeles Dodgers a
4 May 24, 2025, 09:25 PM ET\r\nDENVER -- Aaron Judge insisted he doesn't pay too much attention
5 Name: Nike Dunk Low "New York Yankees"SKU: IM2222-101Colorway: White/Midnight Navy-Ph
6 Jun 19, 2025, 03:59 PM ET\r\nARLINGTON, Texas -- Jac Caglianone has his first career home run
7 Apple and Major League Baseball this week announced the July schedule for Friday Night
8 Major League Baseball unveiled its uniforms for the 2025 All-Star Weekend on Monday, inspi

9 If you purchase an independently reviewed product or service through a link on our web
10 Summary\r\nThe Colombian star revealed several tracks on Twitch last week.
11 Any Yankees fans still shedding tears over Juan Soto's Pinstripes departure can go al
12 "The Pride of the Yankees" was nominated for 11 Academy Awards that year, including
13
14 Another series, another sweep as the Colorado Rockies continue to make history for a
15 Jun 16, 2025, 06:50 PM ET\r\nAaron Judge and Shohei Ohtani, who have combined to win f
16 You pronounce John T. Jobbagys last name with the accent on the first syllable: Joe-
17 On March 29, 2025, the New York Yankees hit a franchise record nine home runs in one g
18 The Boston Red Sox might be the best embodiment of the emotional swings that teams go t
19 New York Yankees' Aaron Judge runs to second base for a double during the fourth inn
20 Summary\r\nMadhappy has opened its doors to the brand's first-ever New York Ci
21 New York Yankees' Jazz Chisholm Jr. runs to first base during a baseball game against t
22 New York Yankees' Aaron Judge reacts after striking out in the third inning of a baseba
23 New York Yankees' Aaron Judge walks to the dugout during the sixth inning of a basebal
24 Kim Ng, who became the first female GM in the history of major North American mens pr
25 New York Yankees starting pitcher Max Fried (54) in the sixth inning of a baseball gam
26 The Yankees announced today that they have selected the contract of left-hander Jay
27 May 22, 2025, 07:00 AM ET\r\nThe Detroit Tigers have continued their meteoric rise up our
28 More than a week into June, it's now too late to be early in the 2025 MLB season.\r\nWi
29 Boston Red Sox pitcher Hunter Dobbins did not allow a walk or get a strikeout in his Yan
30 NEW YORK: José Caballero and Jonathan Aranda of the Tampa Bay Rays celebrate after de
31 New York Yankees' Jazz Chisholm Jr. follows through on a single during the fifth inn
32 New York Yankees' Aaron Judge during the first inning of a baseball game against the N
33 { window.open(this.href, '_blank'); }, 200); return false;">Why did airlines scr
34 There was the Siege of Constantinople in 717. There was the Philadelphia Election Riot
35 On the heels of an early morning trade, here are three things we'll be keeping an eye on
36 New York Mets' Luis Torrens, left, is tagged out by Boston Red Sox catcher Carlos Na
37 The New York Yankees and Boston Red Sox will square off for the first time in the 20
38 AARON JUDGE LAUGHED when I asked him about nap time. He's got a four-month-old daught
39 Jun 10, 2025, 11:34 AM ET\r\nYankees slugger Giancarlo Stanton will begin a rehab assignm
40 Fingers seemingly crossed, New York Yankees manager Aaron Boone implied good news is r
41 Here are four things we'll be keeping an eye on around the baseball world throughout the
42 Yankees manager Aaron Boone provided the media (including the New York Post's Greg J
43 Sam Militello hugs a player after the University of Tampa won the Division-II national ch
44 The Yankees have placed right-hander Carlos Carrasco on outright waivers, reports Joe
45 Jun 19, 2025, 11:19 AM ET\r\nThe New York Yankees placed reliever Yerry de los Santos on
46 Right-hander Jake Woodford has opted out of his minor league deal with the Yankees a
47 In the end, this was just another regular season series with brighter lights. But mar
48 The New York Yankees are the most successful professional franchise in the history of
49 The Yankees are "aggressively" searching for a right-handed bat to add to their liner
50 The New York Yankees' offense is drifting toward uncharted territory and not in a good
51 Diddy's federal jury in NYC is bringing in an alternate ... because a juror has just b

52 The New York Yankees had seven months to think about their fifth-inning collapse in G
 53 The calls began in recent days, cursory in nature but loaded with meaning. MLB trade o
 54 Mookie Betts was out of the Los Angeles Dodgers lineup against the New York Yankees on
 55 The opening weekend of the NCAA baseball tournament is in the books, and it was an enti
 56 It was a nightmare offseason for the defending American League champion Yankees. \r\nI
 57 There is always baseball happening almost too much baseball for one person to handle th
 58 BOSTON -- Aaron Judge blamed himself for swinging at pitches outside the strike zone as
 59 ESPN's "Sunday Night Baseball" presented by Capital One heats up during the month of Ju
 60 May 30, 2025, 08:17 PM ET\r\nLOS ANGELES -- Mookie Betts is out of the Los Angeles Dodge
 61 "The Piano Man" will be commemorated at Yankee Stadium this summer, as the New York Y
 62 There is always baseball happening almost too much baseball for one person to handle th
 63 There is always baseball happening almost too much baseball for one person to handle th
 64 EXCLUSIVE:UTA has signed filmmaker D.J. Caruso for representation in all areas.\r\nCar
 65 May 21, 2025, 09:05 PM ET\r\nNEW YORK -- Texas Rangers catcher Jonah Heim left Wednes
 66 Hall of Fame manager Joe Torre, who guided the New York Yankees to four World Series
 67 The Los Angeles Dodgers and New York Yankees continue their three-game series this Sat
 68 The Phillies vaulted into the top spot in our power rankings for the first time only to
 69 NEW YORK -- The good news for the Yankees on Wednesday was they scored a run after 30 o
 70 NEW YORK -- For nearly three months, the New York Yankees arguably had the best offense
 71 CLEVELAND -- Guardians catcher Austin Hedges has been placed on the seven-day concussi
 72 LOS ANGELES -- The New York Yankees, in need of a fresh arm after Saturday's blowout lo
 73 NEW YORK -- Less than a month after undergoing surgery on a fractured left ankle, Oswa
 74 NEW YORK -- For the first time in two decades, the Boone brothers will be in opposite o
 75 May 27, 2025, 01:17 AM ET\r\nANAHEIM, Calif. -- Angels catcher Logan O'Hoppe left Monday
 76 Dominic Smith has become a free agent after triggering the opt-out clause in his min
 77 Jun 17, 2025, 01:25 AM ET\r\nNEW YORK -- Christian Moore's first visit to Yankee Stadi
 78 Max Muncy hit two three-run homers and tied his career high with seven RBIs, helping th
 79 Ryan Yarbrough limited baseballs best offense to four hits over six innings, Ben Ric
 80 May 22, 2025, 12:16 PM ET\r\nNEW YORK -- New York Yankees reliever Fernando Cruz was p
 81 The Yankees expect to place closer Luke Weaver on the 15-day injured list, reports J
 82 Utility player Cooper Hummel has triggered a release clause in his minor league deal
 83 Technically its 21, because the Smothers Brothers did it twice. Sue us.\r\nThe 11th ep
 84 The Yankees are set to welcome Giancarlo Stanton back from the injured list in the re
 85 Yankees reliever Jake Cousins has yet to pitch in the majors this season due to a fla
 86 Madhappy, the sunny-go-lucky Californian clothing label, is finally heading back east
 87 Move over, tank tops. There's a new shirt of the summer in town, and it's surprisingly
 88 Player by player, the New York Yankees and Los Angeles Dodgers feature two of the most h
 89 Jazz Chisholm Jr. hit a tiebreaking home run in his return from a month on the injure
 90 NEW YORK -- The Yankees-Red Sox rivalry, a historic feud running on fumes in recent ye
 91 NEW YORK -- Yankees closer Luke Weaver had a platelet rich plasma injection in his in
 92 Jun 12, 2025, 05:27 PM ET\r\nMore than two months after the death of Miller Gardner, th
 93 LOS ANGELES -- Sunday marked the first time Los Angeles Dodgers shortstop Mookie Bet
 94 NEW YORK -- Yankees infielder Jazz Chisholm Jr. could be reinstated from the injured

Question 3: Building a function to search the API

This function will take some inputs in order to build the URL to search from the api on [News API](#). The inputs will be the subject to search for, the date to search from (should be in YYYY-MM-DD format, will search to present), followed by the API key.

The function will then output a data frame with the article information.

We are going to test by searching for “gamestop” from May 19, 2025 to present.

```
build_newsapi_url <- function(subject, start_date, api_key) {
  #base url from website
  base_url <- "https://newsapi.org/v2/everything?"

  #checking date format is correct - make a stop if incorrect format
  is_valid_date <- function (dates){
    grepl("^\\d{4}-\\d{2}-\\d{2}$", dates)
  }
  if (!is_valid_date(start_date)){
    stop("start_date must be in 'yyyy-mm-dd' format")
  }

  #construct the full url
  url <- paste0(base_url,
                "q=", subject,
                "&from=", start_date,
                "&apikey=", api_key)

  #now call the api
  topic_search <- httr::GET(url)

  #take the data using `fromJSON` to make readable
  parsed_topic_search <- fromJSON(rawToChar(topic_search$content))
  #make the results a tibble
  search_results <- as_tibble(parsed_topic_search)
  #call the article df from the previous tibble
  search_results$articles
}
```

```
build_newsapi_url("gamestop", "2025-06-12", "e09f041046584e7c85072592a8add194")
```

	source.id	source.name
1	<NA>	Slashdot.org
2	<NA>	Gizmodo.com
3	<NA>	Yahoo Entertainment
4	<NA>	GameSpot
5	<NA>	Android Authority
6	<NA>	Xataka.com
7	ign	IGN
8	<NA>	Yahoo Entertainment
9	<NA>	Kotaku
10	<NA>	Gizmodo.com
11	<NA>	Biztoc.com
12	<NA>	Geeksaresexy.net
13	<NA>	TechSpot
14	<NA>	Yahoo Entertainment
15	<NA>	Unwire.hk
16	<NA>	Tom's Hardware UK
17	<NA>	Yahoo Entertainment
18	<NA>	Hdblog.it
19	<NA>	Yahoo Entertainment
20	<NA>	Technews.tw
21	<NA>	Cointelegraph
22	<NA>	Cointelegraph
23	<NA>	Cointelegraph
24	<NA>	Yahoo Entertainment
25	<NA>	Yahoo Entertainment
26	<NA>	Yahoo Entertainment
27	<NA>	Antyweb.pl
28	<NA>	GameSpot
29	<NA>	Yahoo Entertainment
30	<NA>	AOL
31	<NA>	ComicBook.com
32	<NA>	Itc.ua
33	<NA>	Overclockers.ru
34	<NA>	Forbes
35	<NA>	PC Games
36	<NA>	Yahoo Entertainment
37	<NA>	Overclockers.ru
38	bild	Bild
39	<NA>	Leganerd.com

40	<NA>	Techpowerup.com
41	<NA>	ComicBook.com
42	<NA>	Techpowerup.com
43	<NA>	My Nintendo News
44	<NA>	Yahoo Entertainment
45	<NA>	Yahoo Entertainment
46	<NA>	Overclockers.ru
47	<NA>	Everyeye.it
48	<NA>	Cointelegraph
49	<NA>	GameSpot
50	<NA>	Yahoo Entertainment
51	<NA>	Gagadget.com
52	<NA>	Everyeye.it
53	<NA>	Ferra.ru
54	<NA>	Android Headlines
55	<NA>	CNA
56	<NA>	Yahoo Entertainment
57	<NA>	PlayStation LifeStyle
58	<NA>	Ithome.com
59	<NA>	My Nintendo News
60	<NA>	Bitcoinist
61	<NA>	Yahoo Entertainment
62	<NA>	Yahoo Entertainment
63	<NA>	PC Games
64	<NA>	Forbes
65	<NA>	The Daily Hodl
66	<NA>	Thefly.com
67	<NA>	Yahoo Entertainment
68	<NA>	Expressen.se
69	<NA>	Biztoc.com
70	<NA>	Biztoc.com
71	<NA>	GamesRadar+
72	<NA>	GamesRadar+
73	<NA>	The Daily Hodl
74	<NA>	Cointelegraph
75	<NA>	Biztoc.com
76	<NA>	Biztoc.com
77	<NA>	Biztoc.com
78	<NA>	Biztoc.com
79	<NA>	ETF Daily News
80	<NA>	ETF Daily News
81	<NA>	ComicBook.com
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83	<NA>	ETF Daily News
84	<NA>	Decrypt
85	<NA>	Biztoc.com
86	<NA>	Biztoc.com
87	<NA>	ETF Daily News
88	<NA>	Biztoc.com
89	<NA>	Biztoc.com
90	<NA>	Biztoc.com
91	<NA>	ETF Daily News
92	<NA>	Biztoc.com
93	<NA>	Cnbeta.com.tw
94	<NA>	Cointelegraph
95	<NA>	Biztoc.com
96	<NA>	Biztoc.com
97	<NA>	BeInCrypto
98	<NA>	ZyCrypto
99	<NA>	Decrypt

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Billy Bambrough, Senior Contributor, \n Billy Bambrough, Senior Contributor\n h

Nina Bambysheva, Forbes Staff, \n Nina Bambysheva, Forbes Staff\n h

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scott.mccrae9

Maya Gandara, Forbes Staff, \n Maya Gandara, Forbes Staff\n <https://www.forbes.com/sites/>

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\$1.4 million worth of Switch 2 consoles stolen from semi-tr
2,800 consoles were en route from Nintendo of America HQ to a GameStop store in Texas

Cuando iba a entregar 2.810 unidades de Switch 2, el
GameStop to Double-Down on 'High Margin Potent

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Thieves

\$1.4 million worth of Switch 2 consoles stolen from semi-tr
2,800 consoles were en route from Nintendo of America HQ to a GameStop store in Texas
GameStop Spent Over

Prediction: Down 66% From All-Time Highs, GameStop Could Be on the Verge of Going Parabol.

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What's Next?

Prediction: Down 66% From All-Time Highs, GameStop Could Be on the Verge of Going Parabo.

GameStop shares plun

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GME Tumbles After GameStop A

GameStop shares plun

Forget the \$100 and \$130 Deluxe editions, Borderlands 4 has a "J

GameStop Handing \$4,500,000 T

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GameStop shares plun

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Las acciones de GameStop caen un 22% tras au
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Switch 2

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Get Free Report) traded up 3.5% during mid-day trading on Friday . The stock traded as high a

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Get Free Report)'s stock had its "underperform" rating reiterated by equities research analy

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Free Report) by 100.6% in the first quarter, HoldingsChannel.com reports. The institutional

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Free Report) - Equities researchers at Wedbush increased their Q2 2026 earnings per share est

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Free Report) - Equities research analysts at Wedbush decreased their Q1 2027 EPS estimates f

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GameStop --

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but SharpLink Gaming's fall takes the cake on a busy week.

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<https://www.xataka.com/videojuegos/cuando-iba-a>

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<https://www.ign.com/articles/gamestop-to-double->

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<https://www.tomshardware.com/video-games/nintendo/usd1-4-million-worth-of-switch-2-console>

<https://overclockers.ru/blog/mo>

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<https://www.tech>

<https://www.techpowerup.com/3380>

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<https://finance.yahoo.com/news/live>
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<https://www.pcgames.de/>
<https://www>
<https://dailyhodl.com/2025/06/12/gme>

<https://www.gamesradar.com/games/borderlands/forget-the-usd100-and-usd130-deluxe-editions->
<https://dailyhodl.com/2025/06/14/gamest>

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1 Cohen has said that continuing to focus on trading cards, including the incredil
2 The Switch 2 is in pretty high demand. Like, so high that it's leading to cartoon
3 If you click 'Accept all', we and our partners, including 238 who are part of tl
4 GameStop is leaning heavily to trading cards as part of it's future strategy, accor
5 In a high-stakes heist, thieves stole 2,810 units of the newly released l
6 El robo más espectacular en lo que llevamos de junio ha tenido una víctima poco l
7 GameStop\r\n is doubling-down on trading cards.\r\nIn its 2025 Annual Meeting\r\n, CEO
8 If you click 'Accept all', we and our partners, including 240 who are part of tl
9 You wake up at 1 am to score a pre-order. You put yourself in manageable debt to
10 After the massive flop that was the Wii U, consumers had every reason to believe t
11 { window.open(this.href, '_blank'); }, 200); return false;">Why did Metaplan
12 Its been a long eight years since The Legend of Zelda Collectors Edition Chess
13 What just happened? Thieves have made off with almost 3,000 Switch 2 consoles af
14 If you click 'Accept all', we and our partners, including 240 who are part of tl
15 Switch 2 2810 Switch 2 140 HK\$1,092 \r\n 6 8 8 Bennett Switch 2 Redmond G

16 The sheriff of Arapahoe County in Colorado said that 2,810 Nintendo Switch 2 consoles
 17 If you click 'Accept all', we and our partners, including 238 who are part of the
 18 Un carico di ben 2.810 Nintendo Switch 2 è stato rubato da un autoarticolato negoziante
 19 We recently published a list of Investors Are Dumping These 10 Stocks. GameStop Corporation
 20 3,000 Switch 2 consoles
 21 Video game and consumer electronics retailer GameStop has increased its planned price
 22 GameStop (GME) shares fell 11.7% in after-hours trading after announcing a \$1.75 price
 23 Bitcoin has tumbled closer to the psychologically important \$100,000 price level, and
 24 If you click 'Accept all', we and our partners, including 240 who are part of the
 25 If you click 'Accept all', we and our partners, including 240 who are part of the
 26 If you click 'Accept all', we and our partners, including 238 who are part of the
 27 Spektakularna kradzie Nintendo Switch 2 szczegóły zdarzenia\r\nDo zdarzenia prawie 3,000
 28 The Samsung Pro Plus is one of the best microSD cards for Steam Deck, and the 1TB
 29 If you click 'Accept all', we and our partners, including 240 who are part of the
 30 (Reuters) -Trump Media and Technology Group said on Friday that the U.S. Securities and
 31 On June 13th, many gamers woke up to an email about the Aldana v. GameStop Class Action
 32 . . Trump Media and Technology Group (TMTG) BTC \$2,500,000, -15%, MSCI World 3,6% 13,3%
 33 Borderlands 4, Steam , Gearbox Software 2K , NVIDIA GeForce RTX 2070 AMD Radeon RX 5600
 34 Bitcoin has fallen sharply after Israel launched a devastating attack on Iran overnight
 35 Nach dem erfolgreichen Launch der Switch 2 könnte man meinen, die Flut an guten Nintendo
 36 If you click 'Accept all', we and our partners, including 240 who are part of the
 37 Nintendo Switch 2, , , , , Nintendo. , , - Nintendo of America GameStop , . 1,4 , .
 38 Große Freude und dann der Schock! Der Verkaufsstart der neuen Nintendo Switch 2 soll
 39 Un furto clamoroso ha colpito la filiera distributiva della Nintendo Switch 2, e
 40 Gearbox and 2K today opened Borderlands 4 pre-orders, with the rather unexpected
 41 Borderlands 4 is up for pre-order, including the Collector's Edition. However, the
 42 Gearbox and 2K today opened Borderlands 4 pre-orders, with the rather unexpected
 43 It seems GameStop isn't convinced anymore than its turbulent future isn't in view
 44 If you click 'Accept all', we and our partners, including 240 who are part of the
 45 If you click 'Accept all', we and our partners, including 238 who are part of the
 46 Gearbox 2K Borderlands 4, 69,99 , , 80 AAA. Steam , , .\r\n, Borderlands 4 64- , 16
 47 GameStop e gamelife lanciano una nuova iniziativa: nei negozi della catena è ora
 48 Genius Group, a Singapore-based artificial intelligence education company, expanding
 49 Borderlands 4 launches on PS5, Xbox Series X|S, and PC on September 12, and pre-orders
 50 (Reuters) -Prominent short-seller Jim Chanos has questioned Strategy's valuation
 51
 52 Una estate di grandi sconti ti aspetta da GameStop e gamelife con i Super Gamer
 53
 54 The Nintendo Switch 2 is a hot commodity, so much so that the theft of the console
 55 Trump Media and Technology Group said on Friday that the U.S. Securities and Exchange
 56 If you click 'Accept all', we and our partners, including 240 who are part of the
 57 A fresh Nintendo Switch 2 restock has finally made the console available to buy again
 58

59 A delivery truck driver had a nasty surprise earlier today in Colorado when he c
 60 GameStop has told investors it plans to raise \$1.75 billion through convertible r
 61 US stocks pulled back on Thursday as more data showed milder inflation pressures, c
 62 US stocks edged higher on Thursday as more data showed milder inflation pressures,
 63 Mit dem rasanten Fortschritt von Künstlicher Intelligenz geraten Arbeitsbedingun
 64 So called crypto treasury companies, public firms that focus on acquiring digital
 65 GameStop (GME) stocks are falling following the announcement of a proposal to pote
 66
 67 NEW YORK (AP) U.S. stock indexes ticked higher on Thursday following another encoun
 68 Det var den 8 juni som Arapahoes poliskontor i Colorado, USA, larmades till en ras
 69 GameStop shares plummet 20% as the video-game retailer announces new capital ra
 70 GameStop stock tumbled Thursday on a \$1.75 billion offering, potentially for bi
 71 Nintendo Switch 2 stock is springing back into action this week, with planned res
 72 Borderlands 4\r\n is going to have \$70, \$100, and \$130 versions available, depending
 73 GameStop is preparing to distribute millions of dollars to customers to settle all
 74 How Bitcoin rose amid soaring US debt \r\nWhile Washington, DC printed trillions, Bit
 75 At 9:36 am ET, the company's shares
 76 In This Article:Key Points-CEO Ryan Cohen has helped stabilize GameStop's busine
 77 In This Article:Key Points-GameStop's profits have improved, but sales continue
 78 In This Article:Key Points-GameStop announced the company is raising more capita
 79 GameStop Corp. (NYSE:GME - Get Free Report) traded up 3.5% during mid-day trading
 80 GameStop (NYSE:GME - Get Free Report)'s stock had its "underperform" rating reite
 81 It's been 8 years since the original The Legend of Zelda chess set was released
 82 Independence Day isnt until next month, but some of the best 4th of July sales ar
 83 UMB Bank n.a. grew its holdings in GameStop Corp. (NYSE:GME -
 Free Report) by 100.6% in the first quarter, HoldingsChannel.com reports. The institutional
 84 In brief\r\nGameStop upsized its latest offering of convertible senior note
 85 In This Article:GameStop (GME) stock plummeted as much as 19% in early trading
 86 Shares of GameStop Corp (NYSE:GME) are falling Thursday after the company announ
 87 GameStop Corp. (NYSE:GME - Free Report) - Equities researchers at Wedbush increas
 88 Prediction: Down 66% From All-Time Highs, GameStop Could Be on the Verge of Goin
 89 A cryptocurrency named after GameStop Corp. (NYSE:GME) blasted to triple-digit g
 90 Shares of GameStop, the video game retailer that recently pivoted to Bitcoin inv
 91 GameStop Corp. (NYSE:GME - Free Report) - Equities research analysts at Wedbush c
 92 GameStop (NYSE:GME) has outperformed the market over the past 5 years by 67.1% c
 93
 94 La cadena minorista de videojuegos y electrónica de consumo GameStop aumentó su c
 95 In This Article:We recently published a list of Investors Are Dumping These 10 S
 96 GameStop says it plans to focus on the trading-card business moving forward. Th
 97 La tendencia de establecer reservas estratégicas de Bitcoin a menudo beneficia a
 98
 99 In brief\r\nCircle's stock surged again Friday as signs of stablecoin inter