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**[Is it possible to return a closure that is stored in self?](#)**

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I'm using a trait to implement something like the [template method pattern](#). During parts of the algorithm execution, I'd like it to be able to invoke a callback to report its progress. The way I've been trying to make this work is by storing a `Fn()` on my structs that implement the trait, and then providing a `get_callback` method to provide the callbacks to the default methods on the trait. Unfortunately it's not working.

I suspect the solution will involve some combination of putting the callback in a `Box` and possibly returning a reference, but I haven't been able to get it to work. Here's a minimal non-working example:

```
trait MyTrait<T: Fn()> {
    fn default(&self) {
        let cb = self.get_callback();
        cb();
    }

    fn get_callback(&self) -> T;
}

struct MyStruct<T: Fn()> {
    callback: T,
}

impl<T: Fn()> MyTrait<T> for MyStruct<T> {
    fn get_callback(&self) -> T {
        self.callback
    }
}

fn main() {
    let x = MyStruct { callback: || {} };
    x.default();
}

error[E0507]: cannot move out of borrowed content
--> src/main.rs:16:9
|
16 |         self.callback
|         ^^^^ cannot move out of borrowed content
```

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There is nothing special about the closure here. Your problem is this:

```
fn get_callback(&self) -> T {
    //          ^ you are borrowing self
    //          ^ but you are not returning a reference
    self.callback
```

```
//      ^ so callback needs to be moved out
}
```

A simple solution would be to clone the closure instead:

```
impl<T: Fn() + Clone> MyTrait<T> for MyStruct<T> {
    fn get_callback(&self) -> T {
        self.callback.clone()
    }
}
```

Cloning closures is only stable as of Rust 1.26 ([see playground example](#)).

Another solution would be to actually move out:

```
impl<T: Fn()> MyTrait<T> for MyStruct<T> {
    fn get_callback(self) -> T {
        //           ^ no reference
        self.callback
    }
}
```

This [works on stable](#) but requires a few other changes and modifying the trait.

But most likely, the solution you want is to [return a reference to the closure](#):

```
fn get_callback(&self) -> &T {
    &self.callback
//  ^ there
}
```

But this also requires to change the trait.

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@Shepmaster do you keep a list of questions you have to update on every Rust update? :D

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I use my friend Google: `site:stackoverflow.com rust 1.26`. I also sometimes watch the PRs to [RELEASES.md](#), then search for relevant Q&A for stabilized features. There's a vocal contingent of people who complain that Stack Overflow (with and without Rust) has "only outdated information", so I try to kill them with kindness.

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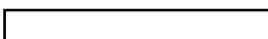
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