A polymorphism in the promoter region of the serotonin transporter gene (5-HTTLPR) has been associated with seasonality both in patients with seasonal affective disorder and in the general population. Method: We used in vivo molecular imaging to measure cerebral serotonin transporter (5-HTT) binding in 57 healthy Scandinavians and related the outcome to season of the year and to the 5-HTTLPR carrier status. Results: We found that the number of daylight minutes at the time of scanning correlated negatively with 5-HTT binding in the putamen and the caudate, with a similar tendency in the thalamus, whereas this association was not observed for the midbrain. Furthermore, in the putamen, an anatomic region with relatively dense serotonin innervation, we found a significant gene X daylight effect, such that there was a negative correlation between 5-HTT binding and daylight minutes in carriers of the short 5-HTTLPR allele but not in homozygote carriers of the long allele. Conclusions: Our findings are in line with S-carriers having an increased response in neural circuits involved in emotional processing to stressful environmental stimuli but here demonstrated as a endophenotype with dynamic changes in serotonin reuptake.