0. Import & parse CSV data

In [112]:
```
import numpy as np
import matplotlib
```

In [113]:
```
from matplotlib.pylab import plot, legend, csv2rec
```

In [114]:
```
trends = csv2rec('trends.csv')
```

I. Plot trends in single frame, with legend

In [115]:
```
plot(trends.week_start, trends.spring_break, label='spring break')
plot(trends.week_start, trends.textbooks, label='texbooks')
plot(trends.week_start, trends.skiing, label='skiing')
plot(trends.week_start, trends.kayak, label='kayak')
legend()
```

II. Determine maxima and minima of each trend term

Create vector of year and week numbers

In [116]:
```
dates = trends.week_start
yrs = zeros_like(dates)
wks = zeros_like(dates)
for i in range(len(dates)):
    yrs[i] = dates[i].year
    wks[i] = dates[i].isocalendar()[1]
```

For each year, list week numbers corresponding to maximum and minimum search values

In [117]:
```
trend = trends.global_warming
for yr in range(2004,2011):
    idx = find(yrs==yr)
    print yr, wks[find(trend[idx] == max(trend[idx]))], wks[find(trend[idx] == min(trend[idx]))]
```

[redacted]

III. Study scatter about median values

Q: Is it true that $\sigma(A) > \sigma(B) \Rightarrow \sigma_{\text{median}}(A) > \sigma_{\text{median}}(B)$?

In [118]:
```
def std_median(datums):
    return sqrt( sum( (datums - median(datums))**2 ) )
```

In [119]:
```
print std_median(trends.spring_break)
print std_median(trends.textbooks)
print std_median(trends.skiing)
print std_median(trends.kayak)
print std_median(trends.global_warming)
```

IV. Correlation between trends

In [120]:
```
result = np.correlate(trends.skiing,trends.spring_break, mode='full')
gap = arange(result.size) - result.size/2
plot(gap,result)
print gap[find(result==max(result))]
```

In [121]:
```
result = np.correlate(trends.skiing,trends.global_warming, mode='full')
gap = arange(result.size) - result.size/2
plot(gap,result)
print gap[find(result==max(result))]
```

In [ ]:
```

```